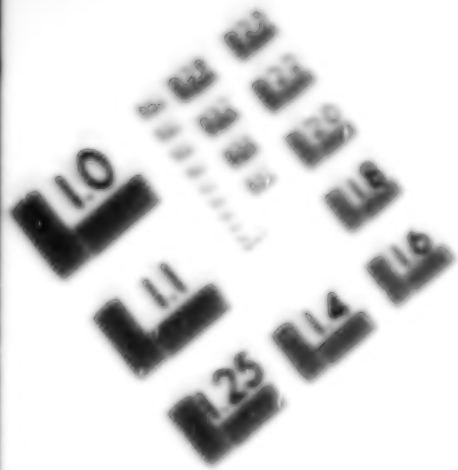

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CONTENTS

Russia: Fast Fourier Transform Information Technologies and Their Implementation in Multiprocessor Systems

MOSCOW AVTOMATIZATSIYA I SOVREMENNYE TEKHNOLOGII in Russian No 8, Aug 95 pp 22-26

[Article by V.M. Ignatiev and A.A. Ilin; UDK 681.325]

[FBIS Summary] The problem of creating processors for implementing fast Fourier transforms (FFTs) (as opposed to discrete Fourier transforms [DFTs]) on both single-processor and multiprocessor systems was examined. First, the two main existing groups of algorithms for accelerated calculation of DFTs, i.e., Cooley-Tukey FFT algorithms and sexual DFT algorithms based on theoretical-numerical concepts, were discussed briefly. Special attention was then paid to the construction of a generalized mixed-base FFT algorithm by representing a one-dimensional array of complex values (input, intermediate, output) as three-dimensional. A generalized mixed-base FFT algorithm in a subregister registers was presented. The said algorithm included two working arrays of complex numbers whose dimensionality is determined by the maximum base of the FFT algorithm. It was stated that although the algorithm is valid for all integer bases greater than 1, powers of 2 are generally selected as the mixed bases so as to make the algorithm more efficient from a labor intensity standpoint. It was further stated that when the new mixed-base FFT algorithm is implemented in multiprocessor systems, it is best for the base operations required in each step of the FFT to be implemented in parallel on the individual processors. Next, the problem of constructing a generalized sexual FFT algorithm was analyzed. The analysis began with a discussion of a generalized sexual DFT algorithm that is based on a Winograd scheme and that, after slight revision, makes it possible to implement a Johnson-Burrus scheme. The generalized sexual DFT algorithm was based on basic Winograd algorithms for blocks of input data with small dimensionalities. The process of obtaining a sexual FFT algorithm was then discussed. It was stated that the sexual algorithm call for transforming a one-dimensional input sequence (x) as an m-dimensional table (designated Bk) obtained from the matrices of the basic algorithms B_k where $k = 0, \ldots, m-1$ and transforming the resultant m-dimensional table (x) a one-dimensional table (containing y) at the output. The FFT algorithm's construction and use are examined in detail. The sexual FFT algorithm was said to be implementable by pipelining by breaking it up into the following stages: 1) reordering x at the input, 2) multiplying the m-dimensional table (x) by the premultiplication matrices of basic algorithms, 3) performing element-by-element multiplication of the m-dimensional table and the m-dimensional table Bk, 4) multiplying the m-dimensional table and the postmultiplication matrices of basic algorithms, and 5) reordering x at the output. In conclusion, it was stated that efficient loading of the individual processors of the multiprocessor system (stage 3) being able to implement each of the five stages in approximately identical amounts of time and that it is therefore necessary to use different numbers of processors to implement each stage. The problem of parallel implementation of stages 1 and 4 was examined. References 4. (Russian)

Russia: Software for the OS-200 Operator Station of the Kvant Software-Hardware System

MOSCOW AVTOMATIZATSIYA I SOVREMENNYE TEKHNOLOGII in Russian No 8, Aug 95 pp 40-45

[Article by M.A. Vinnets, engineer; UDK 681.325:.56]

[FBIS Summary] The OS-200 operator workstation software of the Kvant software-hardware system was designed on the basis of a model that was in turn based on the object approach, with the term "object" referring to the various types of devices (actuators, measuring devices, regulators, logic automata, etc.) involved in the given computer-aided manufacturing process. Each object is characterized by its own set of parameters determining its status and instructions for moving it from one status to another. The database of the OS-200 consists of files/tables in the format of the Paradox database manager. The database is stored on an external carrier (disk), and each of its individual components (e.g., tables describing the structures of the system, standard objects, standard characteristics, object instructions, and control hardware controllers and data transformation networks). The database contains all of the images of the graphic panel and control window used in the OS-200 as well as a library of graphic panel images of the objects and library of figures and pictograms. The software of the OS-200 is written in C++ and operates in a Microsoft Windows environment. The operator station software includes the following basic components: database manager, Graf-200 graphic design environment, operating system configurator, RUNTIME operator station operating mode, and system to distribute and support versions of the operator station. The operator station stores not only the current values of each control variable as obtained from the controller but also values that the operator has power in the controller. Both sets of values may be used to specify an animation. The Graf-200 editor has been developed for use with Windows versions 3.1. Operates on personal computers with a 386SX processor or better and at least 4 Mbytes of working memory and

works best with an SVGA monitor in a 256-color mode. The Graf-200 is a vector-type editor and its editing software and interface are similar to those of other vector editors (such as Corel Draw and Microsoft Draw). The operator station's screen includes one working area and several rectangular systems areas. Both a multidocument interface that permits users to open several windows in the working area simultaneously and a simpler, single-window interface are included. All images created in the environment of the Graf-200 are stored in a single system database, and the Graf-200 allows the importing and exporting of images in the Windows Metafile (WMF) format. The main distinction of the Graf-200 is that it permits the creation of standard images of objects. Each such image is tied to a specific type of object and to a visual description of the behavior of all objects of the said type. The standard images serve several purposes. A copy of an image may be placed on the graphic panel and tied to a specific object, in which case all the copy's dynamic elements are automatically tied to the object's actual parameters and the image becomes ready for use. The operator can call a standard image to the form of a separate window on top of the graphic panel, in which case the tying of the object's parameters to the image occurs the moment the image is called. The mechanism of standard images is used to offer several advantages. First, it shortens the time required for the routine process of tying parameters several-fold, and second, it allows the operator to draw a graphic panel with only a roughly worked-out image of objects. Reference: [illegible] Russian

Russia: Decision of COCOM Bans Supercomputer Imports

[illegible] Moscow SEGODNYA *in Russian* 5 Oct 95 p 9

(Article by Vera Romanova: "So Far We Are Not Standing in Line for COCOM Technologies")

[FBIS Translation] Until Russia may still lay claim to being world class in some areas of science, mainly theoretical, but its lag in computer science and technology is well known, and is generally defined by the word "for ever." And it would scarcely be possible to catch up. Of course, some non-governmental Russian computer companies are trying to "conform," but their attempts are not bringing any significant results, at any event such as would be noticed by anyone but themselves.

It is the opinion of Nikolay Malyshev, science advisor to the RF President, that "avant-garde" efforts of this kind right now should just be given up as a bad job. In relinquishing our own developments, he feels, we should either develop cooperation with the West, or just plant and simply buy Western technology in the [illegible] old tried and true Russian way. This position is embodied in the draft of "Doctrine of Development of Russian Science," which is to be put into practice in early October at the first session of the governmental commission on science and engineering policy under the chairmanship of Viktor Chernomyrdin.

However, Russian organizations are in no hurry to take advantage of foreign innovations. The economic situation and tax policy are such that by acquiring up-to-date equipment, an enterprise loses rather than gains. Nor is there any point in bringing up the usual problems of shipment, customs and delivery. There are, of course, exceptions. Two serious contracts for delivery of the latest computer equipment were recently signed by one of the largest oil refineries in Europe, "Nefis," near Nizhniy Novgorod, and the Institute of High-Energy Physics at Protvino. The refinery is to introduce a computerized control system based on 64-bit machines that will fundamentally change the enterprise management system. It consists of several hundred computers and makes data streams faster and more orderly. In provision with computer equipment, the refinery will be on a par with the most advanced refineries in the world. Protvino physicists will also be working on a 64-bit processor. In this case they are even "setting the fashion": now they lag behind their colleagues, several U.S. national laboratories are getting ready to order the same equipment.

Both contracts were made possible thanks to the collusion of COCOM limitations and were concluded with Digital, which is the official supplier of the U.S. military-industrial complex. That we have achieved access to the really latest technologies is confirmed a fact by the Guinness Book of Records. There the Alpha AXP 64-bit processor is listed as the faster of any in existence. But so far it cannot be said that anyone is rushing up for this kind of advanced technology. And it is not just a matter of the aforementioned economic considerations. Vitaliy Fridlyand, chairman of the Russian division of this same Digital, told the SEGODNYA correspondent that it is very difficult to overcome the stereotype: any foreign company in Russia is looked at as an investor rather than as a partner. "We will be happy to buy your computer technology," vacuum cleaner if you will, never mind, to us—is always what Russian bosses say.

Potential partners make problems as well. As a rule, foreign companies try to put "something" on the Russian market without troubling themselves about whether or not this "something" operates normally. The only ones who have a chance are those who deliver "turnkey" systems, taking upon themselves further servicing and permanent training, as does Digital. This is especially important, as the current skill level of Russian specialists

precludes immediate use of the same technology for controlling production by using computer facilities.

Russia: Promising Spin-Valve Magnetoresistive Memory Elements

AVTOMATIKA I TELEMEKHANIKA in Russian No 10, Oct 95
pp 147-156

[Article by N.P. Vasilyeva, doctor of technical sciences, S.I. Kasatkin, candidate of technical sciences, and A.M. Murzayev, Institute of Control Problems, Russian Academy of Sciences, Moscow; manuscript received 9 Jun 94; UDC 681.327.6]

[FBIS Summary] The authors theoretically study the feasibility of making single-chip magnetoresistive random access memory elements using the spin-valve magnetoresistive (SVMR) effect. The proposed method uses a thin-film structure of high-anisotropy and low-anisotropy magnetic films based on widely prevalent permalloy and FeMnCo alloys. An analysis is made of the method of controlling elements with anisotropic magnetoresistive effect, and the limits of applicability are found. The proposed control method relaxes constraints on the spread of parameters of magnetoresistive elements as compared with conventional techniques, and also increases the reading signal strength and extends the range of control currents at high information density when compared with elements based on the anisotropic magnetoresistive effect. The [illegible] magnetic reading amplifier with automatic zeroing. Studies based on the theory of micromagnetism for a model with uniform distribution of magnetization in a magnetic film have demonstrated the feasibility of making the proposed spin-valve magnetoresistive memory elements. The proposed thin-film structure simplifies fabrication technology by eliminating the additional software in magnetic material needed to increase the coercive force of the magnetically soft films. Analysis of methods of controlling magnetoresistive memory elements has showed that when the preferential axis of magnetization is directed along a magnetic resistive strip, the operation of the resultant structure is on a par with that of a structure with magnetic film software. When the preferential axis of magnetization is directed across the strip, the conventional control method that reverses magnetization only in the low-anisotropic film is impossible because of instability of the state with parallel directed magnetization vectors of high-anisotropic and low-anisotropic films. However, magnetization of both films is reversed during recording in the proposed technique, while that of the low-anisotropic film is reversed during readout, extending the range of control currents and increasing the amplitude of the readout signal. A disadvantage of the method is the high recording current. Figures; 10 references; 12.

[illegible]: Profile Analysis of Micro-[illegible] Semiconductor Capacitors

[illegible]

[illegible]

[illegible]: Chemical Magnetometers [illegible] Cells for Random Sampling Devices

[illegible]

[illegible]

[illegible]: Prediction of the Rate of [illegible] Single-Event Upsets in "[illegible]"

[illegible]

[illegible]

Russia: Alcatel 1000 S-12 Digital Network Established in Perm

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

[illegible]

Russian Radioecological Record of Naval Nuclear Reactors Dumped in the Arctic Estimated

[illegible]

[illegible]

[illegible]

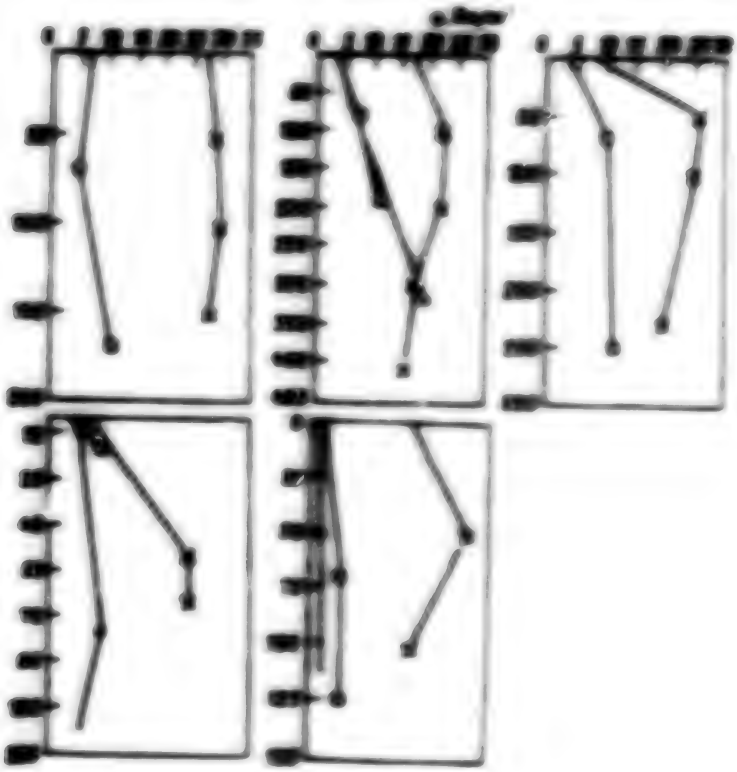

Figure 1

[illegible]

[illegible]

[illegible]

[illegible]

[illegible] water-cooling unit at certain average power level. Under active conditions, the water-cooling unit operates at different powers, for example, in another when reactor power is low. The assumed compensation scheme considering overcooling the true amount of activation radionuclides.

The radioactivity of products of neutron activation was estimated for only the long-lived radionuclides that are significant for a holding time of 10 years or more: ^{60}Co, $T_{1/2}$ = [illegible] years and ^{94}Nb, $T_{1/2}$ = [illegible] years. Estimates showed that the reduced radioactivity of other long-lived radionuclides, in particular ^{14}C, ^{41}Ca [illegible] years and ^{59}Ni, [illegible] years, is extremely low.

For the computation the activity of the radionuclide products of activation of water for exposure time T, $A_{w,T}$, was estimated by using the relation $A = \Sigma_i \Sigma_j [(P_{th} T \Delta K_{w,j} + \Delta K_{c,j} \Sigma_k \Delta K_{c,k}) \Phi_{w,i}]$, where P_{th} is the average thermal power of the reactor; $\Delta K_{w,j}$ is the fraction of neutrons captured in structural metals and a corresponding isotope per fission event; $\Delta K_{c,j}$ is the fraction of neutrons captured in the fissioning assembly and other parts per fission event; Σ_i, $\Sigma_{w,i}$ are the macroscopic capture cross sections of thermal and intermediate-energy neutrons in steel alloys or alloy in steel and water; $\Phi_{w,i}$ is the fluence of the fissioning assembly; Σ_k is the fission constant; and Σ_j is the ratio of activation cross sections of nuclei in other than steel.

In accordance with the proposed model, it was assumed that the mass and composition of the mass of the reactor vessel and internals of the water-cooling unit of reactor do not differ from those used in the computation for power plant, so the available information about the cooling systems of fast elements of modern nuclear reactors. In making calculations of activation radionuclides for reactors that were designed with unclad fuel, it was assumed that the fuel elements have operation and cooling time the second charge in reactor for [illegible] in the coolant [illegible]. Accordingly, the mass of steel was increased to [illegible] kg.

The amount of activation radionuclides formed in a computed reactor operated for T days at average power P_{th} [illegible] was calculated by the relation $A = \Sigma_i [(P_{th} T \Delta K_{w,i} + \Delta K_{c,i}) \Phi_{w,i}]$, where G_i, G_j are the numbers of nuclei of the i-th target nuclides ^{54}Cr, ^{58}Ni, ^{59}Co, ^{93}Nb and ^{94}Nb; $\Phi_{w,i}$ are the cross sections of fissioning of ^{235}U and of activation of a target nucleus by thermal neutrons; Δ is the degree of "burnout" of the neutron spectrum in the reactor; Σ is the neutron capture for a target nucleus; Δ is the decay constant of the product of activation ^{54}Cr, ^{58}Ni, ^{59}Co, ^{93}Nb.

In the calculations, the fast burn-up [illegible] days was used instead of the product of average reactor power multiplied by operating time M° and the degree of burnout of the neutron spectrum [illegible] which corresponds to the [illegible] reactor. The [illegible] neutron-water cooling [illegible].

Calculations of activation in coolant reactor [illegible] for case of fission products were found in [illegible] developed by the [illegible] program for the computer. In estimating the area consideration was given to the difference between the degree of [illegible] in the reactor, in the coolant [illegible] and activation with water-cooled water-moderated reactors [illegible] and liquid-metal cooled reactors [illegible] and the relation $\Phi = A_i B_i C_i D_i$ was used where E_i is the neutron [illegible] that the ratio of fast neutron was used, [illegible] the amount of [illegible] in coolant reactor.

Results of Estimates of Activity of Long-Lived Radionuclides

Figure 1

[illegible] radionuclides [illegible] in coolant reactor and other reactors [illegible] neutron-moderated coolant [illegible]

Results of estimates of the activity of components in [illegible] in the coolant reactor [illegible] the neutron-moderated coolant [illegible] are [illegible] in Table [illegible]. Results show that with [illegible] of the radioactivity of fission products [illegible] are responsible short-lived radionuclides such as ^{90}Sr + ^{90}Y [illegible] days, ^{106}Ru [illegible] days, ^{144}Ce [illegible] days. Among actinides ^{239}Pu and ^{240}Pu have the most radioactivity. Between the two activation radionuclides the predominant one was ^{60}Co which is [illegible] the reactor.

[illegible] of [illegible]. Fig. [illegible] shows the time behavior of radioactivity of the different radionuclides. The increase of radioactivity of [illegible] (half-life [illegible] years) is due to the decay of short-lived fission [illegible] (half-life [illegible] days).

Table 1. Activity of Radionuclides (Ci) in Reactor Compartment of Icebreaker "Lenin" at the Time of the Disposal [illegible]

Radionuclide	Data of [illegible]	Data of Kurchatov Institute [illegible]
Fission products		
[illegible]		[illegible]
[illegible]		[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]		[illegible]
[illegible]		[illegible]
[illegible]		[illegible]
[illegible]		[illegible]
[illegible]		[illegible]
[illegible]		[illegible]
Total	[illegible]	[illegible]
Activation products		
[illegible]	[illegible]	[illegible]
[illegible]		[illegible]
Total	[illegible]	[illegible]
Actinides		
[illegible]		[illegible]
[illegible]		[illegible]
[illegible]		[illegible]
[illegible]		[illegible]
[illegible]	[illegible]	[illegible]
[illegible]		[illegible]
Total	[illegible]	[illegible]
Grand total	[illegible]	[illegible]

Comparison with the report [illegible] shows that it underestimates the radioactivity in the reactor compartment of the icebreaker. This is because towards the remaining the radiation hazard it was been conventional to indicate only the most important radionuclides. Cesium-[illegible] (30 years), cesium-[illegible] (2.3 years), cesium-[illegible] (24,000 years). The results of a detailed given in Table 1 show that the total radioactivity in the reactor compartment was 1.7 times that given in report [illegible] which could be from the errors.

It should be noted that the data obtained at Kurchatov Institute Regional Science Center differ considerably from the previously published estimates of radioactivity in the certain reactor compartments of the icebreaker

[illegible] in particular from results presented at Anchorage [illegible] at a working meeting of experts in May of [illegible]. The main reason for such discrepancies is that other authors have used different values of the average reactor power and the number of effective hours [illegible]

[illegible]

Table 2. Activity of Radionuclides (kCi) in Reactor Compartments of Submarines at the Time of Their Disposal With Spent Fuel in the Kara Sea

Submarine, Order No.	Reactor	Year of Disposal	Date of [illegible]	Date of Assessment [illegible]
285	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total radioactivity			[illegible]	[illegible]

Note: [illegible]

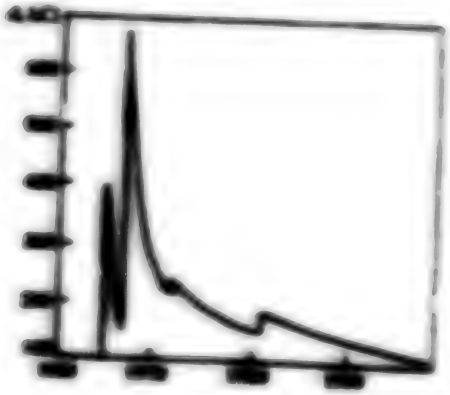

Figure 1

Time dependence of total radioactivity in all sunken reactors dumped in the Kara Sea.

When comparing the data of Table 2, it should be borne in mind that the most radioactive submarine (Order No. 285) was sunk with [illegible] of about 1 year. For the reactor radionuclides with [illegible] short half-lives were predominant in the spent fuel. With allowance for the decay of such fission products, the total radioactivity in all sunken reactors of nuclear-powered submarines was considerably less [illegible]. This is illustrated in the "total" cell of Table 2. The authors of the report [illegible] did not take this into consideration, and so they overstated the data for dumped water-cooled water-moderated submarine reactors by a factor of from [illegible] to 20.

[illegible]

[illegible] of [illegible] data, various [illegible] and [illegible] are of great assistance in evaluating the potential radiation risk. One of these which describes an [illegible] [illegible] case is the assumption of contamination [illegible] [illegible] of all radionuclides in the water, based on approved [illegible] quantitative measures in the [illegible] [illegible] radiation-hazardous situations and ranking of potential sources of radiation risk.

Table 1. Activity of Long-Lived Radionuclides in Naval Reactors Designed Near Nevada Atolls for the Present (1994)

	Fission products		Activation products		Actinides		Total	
Radionuclide Order No.	(Ci)	(Bq)	(Ci)	(Bq)	(Ci)	(Bq)	(Ci)	(Bq)
Cross reactor with fuel								
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Cross reactor without fuel								
[illegible]			[illegible]	[illegible]			[illegible]	[illegible]
[illegible]			[illegible]	[illegible]			[illegible]	[illegible]
[illegible]			[illegible]	[illegible]			[illegible]	[illegible]
Total			[illegible]	[illegible]			[illegible]	[illegible]
Radionuclides of interest								
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Grand total	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

We made such an upper estimate of the possible radioactive contamination of sea water for the scenario of sudden release of radionuclides from damaged submarine reactors. The present (1994) radioactivity of the reactor was taken as the initial activity, and the measure of radiation danger was taken as the permissible concentration of radionuclides in drinking water $Bq_{\cdot}$ recommended in Radiation Safety Standards NRB [illegible]. The scale of radiological consequences was estimated from the volumes of sea water potentially contaminated to $Bq_{\cdot}$. To compare the radiation hazard of submarine compartments designed with and without fuel, the corresponding estimates were made for these two versions separately, and also for water cooled water moderated reactors and liquid metal cooled reactors.

The results data might lead to the hypothetical scenario of two-time sudden release of radionuclides from damaged submarine reactors, the volume of sea water contaminated to $Bq_{\cdot}$ would be about [illegible] km³. This is approximately a cube about [illegible] km on the volume on the Kara Sea. Since the average depth of the Kara Sea is [illegible] m, the radius of the region that would contain all radionuclides from sudden submarine reactors dumped to $Bq_{\cdot}$ would be about [illegible] km.

In conclusion, we give the results of estimates of the radiation risk for the critical segment of the population in the vicinity of the Kara Sea due to consumption of marine products [illegible]. In this context, it is assumed that in the dietary habit these products may be radioactively contaminated due to radionuclides entering from sudden reactors. Two possible diets were considered: diet consumption of [illegible] g of fish or [illegible] g of fish and [illegible] g each of edible parts of seaweed, mollusks and crustaceans. These figures are considerably overstated as there is no commercial fishing industry in the vicinity of the Kara Sea. The calculated total doses and corresponding coefficients of accumulation of radionuclides by individuals recommended by the IAEA. Results

[illegible]

[illegible]

[illegible]

References

[illegible]

[illegible] Development of Mathematical Model for Computing Parameters of Heat Transfer Agent in Heat-Releasing Assembly of Light-Water Reactor With Massive Fuel Elements

[illegible]

[illegible]

[illegible] and has been important [illegible] components. This model makes [illegible] use of the grid method employed for both hydrodynamic and thermal computations of the [illegible]. Among the principal advantages of the model is some flexibility in calculating the hydraulic resistance of the collectors in accord with a given relative perforation [illegible] and uncertainty in the area [illegible] of the outflow orifices in the distributing collector. [illegible] comparisons, made using an average energy release intensity and employing the presented mathematical model, revealed that for reasons of more profiling of the flow through orifices and the degree of perforation of the collector wall, it is possible to achieve acceptable levels of the heat transfer agent parameters here with respect to the level of pressure losses, comparable to the pressure losses in the VVER-1000 and relative to the quantity of metal forming in the [illegible]. Figures 4, references: [illegible] Russian / Western

Russia: Research into Mechanisms of Thermal and Radiational Embrittlement of Steel for Body of VVER-1000 Reactor

[illegible] Moscow [illegible]
MASHINOSTROYENIYE in Russian No [illegible] pp [illegible]

[illegible] Zaitsevna, [illegible] of mechanical sciences, V.A. Vishkarev and [illegible] M. Kozlovskiy, candidate of mechanical sciences, all G.A. Tarasov, doctor of technical sciences, State Scientific Center Central Scientific Research Institute for Heavy Machine Building [illegible]

[illegible] Nowadays, having reached maturity in forming a substantial [illegible] prolonged high temperatures and [illegible] stresses, resulting in serious embrittlement. The several mechanisms by which this occurs are discussed. In the article particular attention is given to research on the steel 15Kh2MFA used in the forming of VVER-1000 reactor. This research concerned the structure of the thermal embrittlement mechanisms, particularly a comparison of [illegible] with equivalent values of [illegible] MPa. For example, the impacting of thermal stresses of [illegible] MPa accelerates the thermal aging processes by a factor [illegible] a sole substantial the mechanical properties of the steel to [illegible] and other different aging regimes. The [illegible] of the radiation [illegible] and it is argued that the use of [illegible] another after [illegible] the maximum irradiation of VVER [illegible]. The conclusions [illegible] of the investigations which is being realized on a continuing basis, with particular attention being given to the influence of [illegible]. Conclusions appear that the factor [illegible] significant only for high fluencies. A mathematical model has been developed which takes the and more [illegible] calculations [illegible]. A determination is proposed for comparing the being strength [illegible] which will [illegible] after a upgrade the method for assessing the resistance [illegible] with an increased [illegible] which will become the basis for comparing the [illegible] comparing the strength of assemblies and [illegible] Figures [illegible] References [illegible] Russian

Russian Claim Development of Ebola Vaccine, Antiserum

[illegible]

(FBIS) Report: Russian media reports indicate that Russian scientists have developed an antiserum against the virus which causes Ebola fever, a highly lethal tropical fever. Ebola is endemic in Russia, and are also working on a vaccine. Military physicians (Russian Public Television First Channel Network, 24 Apr 95) at the Virology Center of the Russian Defense Ministry's Microbiology Institute (KOMSOMOLSKAYA PRAVDA, 24 Apr 95) have announced the development of an antiserum to Ebola which "makes it possible to save up to 100 percent of patients." The antiserum is derived from horses' blood (KOMSOMOLSKAYA PRAVDA, 24 Apr 95; VOENNYY VESTNIK, Mar-June 95). The scientists involved with the breakthrough are: Doctor of Medical Sciences Colonel Viktor Mikhailov, Candidates of Medical Sciences Igor Bondarenko, V. Krasnoyarov and V. Grigoriyev, and Candidates of Biological Sciences N. Pozdnyakov, Ye. Lebedinskiy, S. [illegible] and C. Tsvetkov. The center is subordinate to the Radiation, Chemical and Biological Protection Troops, headed by Igor Tikhonov (KOMSOMOLSKAYA PRAVDA, 24 Apr 95).

According to KOMSOMOLSKAYA PRAVDA, the military researchers began to work on obtaining a genetic protector against Ebola in 1991. Although "not exclusive to such remote African diseases," the researchers began this research because of "an outbreak in a disease very similar to Ebola—the Russian version of American military fever." Several months ago, they created an effective hyperimmune serum and gave the World Health Organization 100 doses for use in the 1995 Ebola outbreak in Zaire, where it gave excellent results.

OGONYOK, No. 21 Jun 95, reported that scientists at the Vektor Government Science Center's Institute of Molecular Biology have been working on a recombinant Ebola vaccine for several years and plan to spend several millions of U.S. dollars of their own funding. Although Vektor is now "an independently operating institution under the Ministry of Health" (LITERATURNAYA GAZETA, 17 Jun 95), according to Professor Sergei Yaroslavtsev, director of Vektor Ebola research, several years ago for different purposes "it did not have publishing in research results since 1992, when it was first allowed to do so" (OGONYOK, No. 21 Jun 95). Vektor has received no government support for its Ebola work since 1992, and the year obtained only a quarter of necessary operating funds. The center is reportedly experiencing severe financial difficulties and has practically stopped research work (OGONYOK, No. 21 Jun 95; also see comparison article).

31 May 1995, in apparent contradiction to these reports, Prof. Yevgeniy Tkachenko commented that the Belarusian Institute of Epidemiology and Microbiology in Minsk was the only institution in CIS territory to be conducting Ebola research (NEZAVISIMAYA GAZETA, 31 May 95). Tkachenko is a department head at the Russian Academy of Medical Sciences M. P. Chumakov Institute of Poliomyelitis and Viral Encephalitides (NEZAVISIMAYA GAZETA, 31 May 95), and his comment may indicate shortfalls in coverage in the research programs in the general press, even though they have been reported in the scientific literature.

Russian Biomedical Research Threatened by Lack of Funding

[illegible]

(FBIS) Report: Russian research in the media, Ebola virus has been continuing against a background of increasingly limited funding for biomedical research. According to OGONYOK, applied medical research has seen "50-70 percent drops in financing from year to year." As a result, Russian biomedical science has experienced increasingly high brain drain "because of the high quality of research in this field." An estimated 25-50 percent of scientists 30-40 years old have left the country. Major research institutes have tried to become self-sufficient by producing medical products, but relaxation of energy price controls combined with government regulation of pharmaceutical prices have made it a difficult endeavor (OGONYOK, No. 21 Jun 95; NEZAVISIMAYA GAZETA, 25 Jun 95).

Press reports indicate that a number of major biomedical institutes are in dire need of funding. A common claim is that the institutes are unable to pay for utilities and are in constant peril of having them shut off by privatized companies. Directors of the institutes emphasize the consequences of shutting down the special air cleaning and refrigeration systems—the loss of vaccine and diagnostic strains and the danger that extremely virulent microorganisms could be released, endangering the public health.

The summer Vektor State Science Center director, Aleksandr Lev Vasilyev, successfully used these arguments to persuade the Ministry of Finance to cover the Vektor electricity bill (LITERATURNAYA GAZETA, 17 Jun 95). In contrast, eighteen months earlier, the same ministry refused to fund national activities at the State Science Center for Applied Microbiology in Obolensk—despite a request from Pres. Vice Premier Oleg Soskovets, in the name of the Russian

government" (ROSSIYSKAYA GAZETA 25 Jul 95)—on the grounds that the Russian Federation's reserve fund is to be used only for emergencies. The Obolensk center, which reportedly does "cutting-edge" research in genetic engineering and is "equipped to handle the most dangerous organisms," continues to be threatened with having its utilities shut off for "unauthorized failure to pay debts" (ROSSIYSKAYA GAZETA 25 Jul 95).

According to (GOLOS, No. 23 Jun 95), "every month two well-monitored wonders come to turn off the water and electricity" at the Scientific Research Institute for Virology, housing Russia's vast collection of indigenous viruses and samples of all viruses received from abroad. The institute provides viruses to all CIS virology laboratories and serves as the depository for all useful viruses, including vaccine viruses and the corresponding antisera. While the virology institute has received a [illegible] Soros grant, it has a [illegible] million ruble debt.

Raising a different justification for government funding of biomedical institutes, ROSSIYSKAYA GAZETA reporter Sergey Pechkin (25 Jul 95) presents on their value in providing deterrence measures against biological weapons. Pechkin, while denying that Russian scientists ever created "military mutant" viruses, claimed that the U.S. has been continuing offensive biological warfare research. "You can scoffingly or anything except but Russian centers—the Virology Center in Koltsovo near Novosibirsk, and the Microbiology Center in Obolensk near Moscow—for worry. He noted, however, that the Obolensk center has been reduced to making ends on the grounds of its "closed" microbiology base.

Coming on soon after the Zaire outbreak, the recent spate of articles on Ebola research in the popular press may indicate an effort by interest directors to turn back needed funding by placing off current official concerns. Recent cholera and malaria epidemics carried by travellers have convinced Russian officials to the possibility that Ebola could also be imported. During the 1995 Ebola outbreak in Zaire, then emergency screened travellers from the affected region, and suspected cases under observation for 20 days (IZVESTIYA 23 May 95) and set up isolation wards (IZVESTIYA 23 May 95, SELSKAYA ZHIZN 22 Jun 95, TRUD 24 Jun 95).

Discovering Valuable Achievements

Press articles detailing medical successes financial problems also list recent scientific developments that could be exploited if funds were available. In addition to Ebola vaccine and antisera, microbicides spermicides include

— a map showing the distribution of "hundreds of strains" of viruses which the Institute for Virology epidemiologists collected on the territory of the former Soviet Union, including some previously not thought to be indigenous (GOLOS No. 23 Jun 95).

— a complete atlas of indigenous viruses also compiled by the Institute for Virology. The atlas is scheduled to be published in Russia because of the limited and costly and high printing costs (GOLOS No. 23 Jun 95).

— cancer diagnosis, methods and treatments, antiviral, genetically engineered insulin, and soil bacteria, dubious microorganisms, all created at the State Science Center for Applied Microbiology in Obolensk (ROSSIYSKAYA GAZETA 25 Jul 95).

Public Health Watch

[illegible]

Cholera Entrenched in Ukraine

(TRUD Report) A group of microbiologists and scientists from institutes in Kherson have concluded that the cholera vibrios has established itself in the Dnepr Bay, mainly as a result of migratory plankton. They say that nearly epidemics can be expected unless ecological balance is restored. The specialists advocate a program of emergency measures. In particular, they recommend halting the nearly use of sewers, installed biocidal cells, sources of Dnepr water for irrigation, which has created 10,000 hectares of pathogen-harboring swamp (Moscow LESNAYA GAZETA, 11 Jan 95).

Hepatitis Outbreak in Ukraine

According to the Civil Defense Staff of Ukraine, more than two thousand residents of Kherson (Lagunna Ochaki) have been hospitalized with hepatitis, and experts predict a 20-30 percent increase in cases. The patients were forced to use wells and local water sources after their water service was turned off for lack of bills. Local bodies of water that became contaminated with raw sewerage when rain overpowered sewerage treatment plants. With 4,000 accounts in arrears due to emergency conditions and hundreds of cubic meters of raw sewerage being discharged into rivers, water supply problems are reportedly a major concern of the Civil Defense Staff (Moscow KRASNAYA ZVEZDA 4 Nov 95).

Tuberculosis Rising in Moscow

The Moscow City Council recently reviewed the city's tuberculosis control efforts, hearing reports from Russian Academy of Medical Sciences Academician Aleksandr Khomenko, who is director of the Central

Research Institute for Tuberculosis, and Irina Pavel Bo[illegible], chief physician at Hospital No. 7, Moscow's tuberculosis incidence reportedly rose sharply in the past three years, with cases doubling among children. An increasing percentage of newborns are being exempted from vaccination for health reasons, and up to half of the children in sanatoriums are infected. The majority of adult cases are unskilled workers. Six percent, white collar workers represent 77 percent of cases, and office workers 2 percent. Although 95 percent of patients achieve sputum resistance, it is often impossible to keep the patients hospitalized until therapy is complete. Moreover, the Moscow public health department recently closed the only dental clinic for tuberculosis patients, increasing the risk of transmission at general dental offices (Moscow IZVESTIYA 20 Dec 95).

Pollution Raises Typhus Risk for Moscow

Epidemiologist Lyudmila Tovt, a Moscow expert on pediculosis, told IZVESTIYA that Moscow is in danger of an outbreak of typhus because of the six-fold increase in lice infestations over the past two years. Since the start of the year, Moscow has recorded 11,000 cases of scabies, or a 25 percent increase over last year, and 5,200 cases of pediculosis. While pharmacies are achieving an adequate supply of medicines, both domestic and imported, health facilities, which can handle up to 4,000 cases per month, are hard pressed to deliver all the refugees and homeless who need it (Moscow IZVESTIYA 1 Nov 95 P 6).

Refugees Bring Tuberculosis to Russia

The incidence of tuberculosis in Russia is on the rise, with 20 cases registered during the first nine months of 1995, compared to 19 for all of 1994. An increase in the numbers of refugees from Central Asia and migrants is thought to explain some of the increase in tuberculosis (Moscow VECHERNYY BISKVIM 22 Dec 94 p 2).

Call for Regulation of Food Imports

In an article entitled, "Products Banned or on sale for Pennies Sold in Russia," IZVESTIYA reporter Aleksandr Gabrusenko called for government regulation of the quality of imported food products, organization of the system of veterinary, quarantine, and sanitary check points, and improved equipment for customs and inspection agencies. The reporter said that the first half of 1995 saw a 20.5 percent increase in the amount of imported food products that were rejected for poor quality, and that imports account for "the lion's share" of food sales in Moscow, St. Petersburg, and Yekaterinburg (IZVESTIYA 1 Nov 95).

Hepatitis Surge in Yekaterinburg

Health authorities are observing a rise in hepatitis among intravenous drug abusers in the first six months of 1995. 657 patients were treated for viral hepatitis, and 194 are still receiving treatment, including 150 patients. Seventy percent of the group were addicts, forty percent of whom had had shared needles. Viral hepatitis is considered a marker for AIDS, reports that the AIDS epidemic could spread rapidly among Yekaterinburg drug users (Yekaterinburg VECHERNYY YEKATERINBURG, 17 Aug 95).

Poor Quality Alcohol Poses Hazards

Over 500 Christians die from poisoning with poor quality alcohol every year, a reputable fact has doubled since 1990 (Moscow RABOCHAYA TRIBUNA 10 Jan 95).

Russian Government Defends Fetal Transplants

[illegible]

FBIS Report: A spokesman Russian government commission has declared groundless a German film alleging that two prominent Russian medical institutions are illegally selling human fetal tissue. At the same time, information in Russian press articles indicates possible conflicts of interest in the commission's investigation, and in the mental health of lead research. The continuing controversy could result in tighter regulation of Russian research in this novel therapy.

Charges Found Invalid

Aired on 7 January Russian Television, the Russian independent television NTV's the OPRSEL TV film alleged that the International Institute for Biological Medicine (MIBM) was selling and exporting transplants made from human fetal tissue and performing experiments on orphaned children [illegible]. It also accused the Russian Academy of Medical Sciences Center for Obstetrics, Gynecology and Perinatology (RAMN TsAGP) of providing the MIBM with fetal material from illegal abortions performed using Nalador-500, a drug manufactured by the German Schering firm, but banned in Germany [illegible]. The film also claimed that TsAGP withheld anesthesia from abortion patients to ensure the quality of the fetal material and that it used dangerously outdated forceps [illegible]. The broadcast reportedly shocked the Russian public [illegible].

Responding to an intense reaction to the Russian public [illegible], on 9 January Prime Minister Chernomyrdin ordered Health Minister Aleksandr Tsaregorodtsev to appoint a commission to investigate the charges. [illegible] the

[illegible] of Russian Academy of Medical Sciences academicians D. Sarkisov, N. Bochkov, Yu. Lopatkin, M. Shchepotin, and V. Shumakov; Professor V. Rogov; N. Gregorian, head of the Health Ministry's Legal Department; V. Yudin of the Russian Academy of Sciences Institute of Man; and Moscow's Chief Obstetrician-Gynecologist Yu. Bodnarchuk as members (12). Deputy Minister of Health N. N. Vagnerov headed the commission.

At a press conference held three days later, the commission announced their conclusion that the accusations were unsubstantiated. They said that the MSBM had never sold brain tissue, that the first tissue transplant therapy MSBM performed on children is not an experimental technique, and that Neuradin-700 was approved for medical use in Russia in 1991 and is being used in 20 countries, including Germany (1). The commission also said that the film was brought with lacking errors and that most of the footage had not been shot at the accused institutions (4).

In earlier interviews Health Minister Tsaregorodtsev said that the commission's work was in compliance with law (5,6). He said that neither pharmaceutical regulations nor the Russian law on organ and tissue transplantation apply to brain material transplants, and that the MSBM and RAMN TsAGP had been properly licensed for therapeutic use of the new technology. He also said that all abortions were performed before the 20th week of pregnancy with informed consent (4). Following the commission's verdict, Tsaregorodtsev said that he had not ruled out a transfer not against (SPIEGEL-TV (2)), a move that some commentators speculated (2,7,10).

Press Coverage

Press reports indicate that the special commission's judgments did not quell the controversy. NEZAVISIMAYA GAZETA (1,14) claimed that the western pharmaceutical industry was trying to discredit the MSBM because it has "advanced too far in brain tissue transplants, which may become a serious alternative therapy to pharmaceuticals."

Other newspapers, however, took up SPIEGEL-TV's charges. PRAVDA (15) carried an interview with Vadim Pokrovsky, head of the Russian Scientific Methodology Center for AIDS Prophylaxis, who declared that the SPIEGEL-TV report was essentially correct. KOMSOMOLSKAYA PRAVDA (6) claimed that the MSBM's brain therapy is ineffective and has not been properly authorized. Commenting that "there is no smoke without fire," RABOCHAYA TRIBUNA (16) posited that the potential for the medical profession to engage in organ sources for profit. Several newspapers discussed brain transplant therapy as merely representative of larger or other problems (2,6,7,16).

Several newspapers called for review of the legal status of brain transplant therapy and its ethical implications. KOMSOMOLSKAYA PRAVDA (6) and PRAVDA (15) objected to the lack of legislation governing brain tissue transplants and said the Duma needs to legislate; also, one could read an ethical debate should brain therapy become widely available. NEZAVISIMAYA GAZETA (14) published an article by Russian Supreme Soviet Committee Deputy Chairman Boris Yudin, a member of the special commission. Yudin wrote that the ethical issues are the legal status of the fetus, determination of brain death, and the possible negative impact of widespread application of the therapy. He also advocated creation of government-regulated but independent bioethics commissions consisting not only of physicians but also of legal experts, priests and public representatives (14).

Conflicts of Interest?

Details of Russian media reports indicate that commission members and others who ruled on the legality and ethicality of the institutions' work had professional interactions with the accused institutions.

— Deputy Tsaregorodtsev's association of the commission's of RAMN members who served on the special commission (6), one of the accused organizations is an RAMN component, and the other employs RAMN members on its advisory council (5).

— Commission head Vagnerov reportedly authorized the MSBM's brain research (4,5).

— According to KOMSOMOLSKAYA PRAVDA, the sole right been for the activity of brain transplant operations is the recommendations of the bioethics committee headed by an interested organization—the RAMN TsAGP (2).

— The Health Ministry reportedly granted the MSBM the right of organ donors in the field of brain transplantation research (5).

Review To Follow

Official scrutiny of the ethical issues associated with brain tissue transplants appears to be in progress. As early as 12 January press conference the special commission acknowledged the need for better regulation of these procedures and called for review by the Russian Academy of Medical Sciences (RAMN) president, RAMN ethics committee and the Health Ministry (1,14). Moreover, the newly appointed chairman of the Russian State Duma Health Committee, Nikolay Fedorovich Gavrishenko,

reportedly expressed his concern in growing hostility over controversy [illegible] research and patients' rights [illegible]

These deliberations could result in legislation clarifying the legal status of fetal tissue research and therapy, as well as its administrative process. A possible outcome is restriction of fetal tissue transplants. There are indications, however, that the government's attitude toward the field will continue to be protective. Prior, the special commission reportedly recommended that officials encouraging critical issues early in order that "measures and ending" issues of Russian research in the field [illegible] Second, MINZDRAVMEDPROM director Professor G. Sokolov reportedly welcomed the increased government focus on fetal research, including the impending RAMN presidium review and support from the Health Ministry management, as a positive consequence of the UPRIGHT TV scandal [illegible]

Key Research Role

An obvious aspect of the case is that the current medical institutions reportedly belonging to [illegible] controlled by a foreign monetary multinational, which coordinates fetal transplant research in the Russian Federation [illegible]

According to the newspaper MEDITSINSKAYA GAZETA [illegible], the MEBM is a joint venture between the RAMN TsAGP and the Biomedical Research Organization (BRO), [illegible] reported in a [illegible] MEDITSINSKAYA GAZETA or Moscow [illegible] KOMSOMOLSKAYA PRAVDA [illegible]. The BRO which controls 51 percent of MEBM stock, provides laboratory equipment and prepares fetal tissue for transplantation [illegible]. The Russian partner, which MEDITSINSKAYA GAZETA calls "entirely governmental" [illegible] supplies the MEBM with fetal tissue, conducts medical research and treats patients [illegible]. According to MEDITSINSKAYA GAZETA, the government provides almost no funding to fetal therapy research, although scientists hope to win grants from the RAMN and Health Ministry [illegible]

The MEBM researches and develops new therapeutic treatments for fetal tissue transplants. It also plans to launch a joint project with the M. M. Shemyakin Institute for Bioorganic Chemistry to obtain new biologically active substances from fetal tissue and master biotechnological production of them [illegible]. MEBM conducts various research projects in conjunction with other prominent medical institutions. In fetal transplant research, which KOMSOMOLSKAYA PRAVDA and RABOCHAYA TRIBUNA determined as expensive and inexpensive treatments for "the wealthy and well-heeled" [illegible] it has covered a wide range of diseases and conditions.

MEBM research in the clinical testing stage includes:

— early treatment of central nervous system disorders, such as juvenile cerebral palsies;

— treatment of Down Syndrome children;

— a novel treatment for birth defects of limbs, with Central Institute for Traumatology and Orthopedics;

— experimental disease therapy, with pediatric clinic of Old Sechenov Medical Academy;

— attempts and experiment with the Center for Human Reproduction;

— novel implants of fetal tissue into deep brains, with the Moscow Emergency Medical Institute;

— novel transplants of embryonic pancreas cells in treatment with the RAMN Institute for Transplants and Artificial Organs;

— therapies for congenital cataracts of the lens, hematological and nephrological diseases, severe neurological disorders, including Parkinson's, at the Russian Federation Inter Central Clinical Hospital and Moscow Central Clinical Hospital;

— treatments for rheumatoid arthritis and other rheumatic diseases [illegible]. Mr. [illegible] Dmitri Sergeyev, director of injecting fetal cells into a specific organ into the patient. Tissue from fetuses younger than 12 weeks are used because they lack immunological differentiation, eliminates the need for immunosuppressants [illegible]

Sources

[illegible] Moscow MEDITSINSKAYA GAZETA [illegible]

[illegible] Moscow ROSSIYSKIYE VESTI [illegible]

[illegible] Moscow Itar Tass [illegible]

[illegible] Moscow SOVETSKAYA ROSSIYA [illegible]

[illegible] Moscow MEDITSINSKAYA GAZETA [illegible] 29 Mar [illegible]

[illegible] Moscow KOMSOMOLSKAYA PRAVDA [illegible]

[illegible] Moscow RABOCHAYA TRIBUNA [illegible]

[illegible] Moscow MEDITSINSKAYA GAZETA 29 Dec [illegible]

[illegible] Moscow BYULLETEN EKSPERIMENTALNOY MEDITSINY [illegible]

[illegible] Moscow BYULLETEN EKSPERIMENTALNOY MEDITSINY [illegible]

[illegible] Moscow KOMSOMOLSKAYA [illegible]

(12) Moscow MEDITSINSKAYA GAZETA [illegible] 22 Jan 90 p 1

(13) Moscow NEZAVISIMAYA GAZETA [illegible] 17 Jan 90 p 4

(14) Moscow MEDITSINSKAYA GAZETA [illegible] 7 Feb 90 p 5

(15) Moscow PRAVDA [illegible] 19 Jan 90 p [illegible]

(16) Moscow RUSSIYSKAYA GAZETA [illegible] 10 Jan 90 p [illegible]

(17) Moscow MEDITSINSKAYA GAZETA [illegible] 7 Feb 90 p 5

(18) Moscow RUSSIYSKIYE VEST[illegible] [illegible] p [illegible]

(19) Moscow MEDITSINSKAYA GAZETA [illegible] 7 Jan 90

New Approach to Detection of Microorganisms as Bioindicators of Soil Contamination by Radioactive Wastelands

[illegible] St. Petersburg MEDITSINSKAYA PITSIPATOLOGIYA in Russian [illegible] 90 manuscript received 20 Jan 90 pp [illegible]

[Article by N.N. Zhdanova, V.A. Zakharchenko, A.I. Vasilenko, A.V. Polishchuk, L.P. Nakonechnaya and L.V. Arapchenko, Microbiology and Virology Institute, Ukrainian National Academy of Sciences, and Radiobiology, Mycology and the Protozoans Institute, Ukrainian National Academy of Sciences, Kiev. [illegible] 691.[illegible] 0.[illegible] 004.48[illegible] 574.2]

[FBIS Summary] An effort was made to detect microorganisms which could serve as bioindicators of soils contaminated by radionuclides by using the factor and correlation analysis methods. A study was made of soil samples from 10 observation points in the Kiev zone around the Chernobyl Nuclear Power Plant [illegible] and in the Lysimeldinskiy test site, located within the scientific zone of radioactive contamination between the exclusion zone and the Kiev metro area [illegible]. A total of 750 soil samples were analyzed. The density of surface contamination of soils with the radionuclides Cs-137, Sr-90 and Pu-239 at different sites was determined. More than 3,000 cultures, assigned after identification to 180 species of 72 genera, were isolated from the soil samples and the frequency of their occurrence in general was ascertained. Analysis of the species composition of microbiocenoses in the Kiev observation zone revealed that there were two distinctly definable stages in its change during the entire observation period. In the first stage [illegible] there was a predominance of microbiocenoses containing spores in the soil, whereas during the second stage [illegible] there was formation of a relatively group of [illegible] species, a [illegible] growth of a quantitatively and qualitatively predominant [illegible] fungi-pigmented species. Thirteen microbiocenoses species were selected as bioindicators of soil contamination. Chaetomium cochlioides and Paecilomyces [illegible] were typical for high and average soil contamination of the wastelands. It is recommended that fungi with [illegible] high factor loading be selected as bioindicators. Figures [illegible] references [illegible] Russian, [illegible] Western.

Russia: Tracing of Water Species of Genus Anopheles Fam.

[illegible] St. Petersburg MEDITSINSKAYA PITSIPATOLOGIYA in Russian [illegible] manuscript received [illegible] Jan 90 pp [illegible]

[Article by [illegible] and A. Zhuravlev, Medical Parasitology Institute, [illegible] Russian Academy of Sciences and Technology Institute, [illegible] Moscow, [illegible] St. Petersburg. [illegible] 616.[illegible]]

[FBIS Summary] During recent years [illegible] in Russian [illegible] have been [illegible] to fungi contaminated with [illegible] in the malaria [illegible] was found that there were considerably [illegible] species of [illegible] and [illegible] in the early stage of phylogenesis [illegible] with some edible species. The fungi was particularly abundant in these stages in there were [illegible] species under conditions. The world literature on this subject is extensive, but the Russian literature is [illegible] of the available information is outdated. The study therefore is essentially a review of the fungi consumed with emphasis on the permanent [illegible] and [illegible] methods. Ten dominant species [illegible] were studied by the MPLC method on the grounds [illegible] and [illegible] phalloidin and phalloxin. The [illegible] were detected only in 4 phalloidin [illegible] in different geographical origin. The contents of the toxins and their distribution among separate parts of the fruit bodies were studied. Concentrations of amanitins were higher in the pulp than in the stipes and much higher than in the volva. The phalloidin levels in the pulp and stipes were approximately equal, but in the volva the level was slightly lower. Phalloidin concentrations in the pulp and the volva were several times lower than in the stipes. The [illegible] of amanitins and phalloidin was estimated for the different parts of the basidiomata. The [illegible] chromatographic profiles were characteristic of the species level. References [illegible] Russian, [illegible] Western.

Ukraine: State Science Center of Medicinal Remedies, Activity Results, Science Potential

[illegible] Kiev [illegible] ORIGINAL in Ukrainian [illegible] pp [illegible]

[illegible] Director of Pharmaceutical Sciences, Professor, Academician of the Engineering Academy of Sciences of Ukraine, V.P. Georgiyevskiy, Director DNTsLZ State Science Center of Medicinal Remedies, State Pharmacopoeia Committee, Ministry of Public Health of Ukraine State Science Center of Medicinal Remedies under the Third Congress of the World Federation of Ukrainian Pharmaceutical Societies [illegible]

[illegible] Translation from The State Science Center of Medicinal Remedies, its [illegible] and other institutions of the type in Ukraine and the CIS, was founded in [illegible]. It was started at the Experimental Chemical Pharmaceutical Institute, Experimental Institute of the Ministry of Public Health of Ukraine [illegible] All-Ukrainian Experimental Pharmacy Institute [illegible] Ukrainian Scientific Research Chemical Pharmaceutical Institute [illegible] and All-Union Scientific Research Institute of Chemistry and Technology of Medical Remedies [illegible]. Right in [illegible] center in [illegible] it differed [illegible] from leaders by Professor [illegible], Professor [illegible], Academy Correspondent of Chemical Sciences [illegible] and Professor [illegible]. During early [illegible] medicinal remedies [illegible] activity participated in developing materials for the State Pharmacopoeia and published collections of articles. Consultative Meetings for pharmacy personnel in [illegible] organized [illegible] and [illegible] suggested by world [illegible] research institutes of this kind throughout the [illegible] the institute began expanding in an integrated scientific research institution. During the Great Patriotic War the institute was evacuated to the city of Frunze, where it worked for battle-front needs, and after the war it took an active part in the reconstruction of Ukrainian chemical pharmaceutical industry. During the [illegible], [illegible] and [illegible], the institute was transferring itself to the basic organization of the USSR Ministry of Public Health and later of the USSR Ministry of Medical Industry in the field of investigation of multi-made medicinal remedies, standardization, analysis, etc. Nowadays the State Science Center of Medicinal Remedies DNTsLZ is a multiprofile scientific research organization that conducts basic research studying the interrelationship between the structure and effect of biologically active substances, molecular biology and pharmacokinetics and develops pharmacologically and medicinal remedies, including those based on natural components and produced by partial synthesis, etc. It has five departments, 19 laboratories, [illegible] [illegible], a research base for medicinal plants and an experimental plant. Among its personnel are 23 Doctors and 78 Candidates of Sciences. The highly skilled personnel and relevant material-technical base made it possible for the institute to take part in implementation of Ukrainian State programs for [illegible] of drug development, novel biology and biotechnology, active substances in pharmacology, and implementation of comprehensive. During its activities the [illegible] of Ukraine has developed and implemented ten medical practical drugs, 200 analytical normative documents and [illegible] developments of the [illegible] of documents and published 14 monographs. The Scientific Council is a [illegible] of Ukrainian organizations that make personnel with the highest qualifications in [illegible] a special council on scientific degrees of Pharmacy. Qualification was organized under the Council's auspices. Since [illegible] students on [illegible] have been from Russia, Turkmenistan, Kazakhstan, Uzbekistan, Lithuania, and adjacent [illegible] Ukraine. Institute [illegible] Doctor of Pharmaceutical Sciences [illegible] the Council [illegible] is [illegible] a strong [illegible] important problem concerning modern competitive medicinal remedies [illegible] Ukraine [illegible] to the best [illegible] of graduates of students. Nevertheless, according the State Committee of Ukraine for the Medical and Microbiological Industry, in the technology and development of multi-made medicinal remedies, the institute is [illegible] with [illegible] other scientific research institutes including the NAS (National Academy of Sciences) and AMS (Academy of Medical Sciences) of Ukraine, [illegible] institutes, [illegible] developed the national Integrated Program for the [illegible] for Medical Chemicals and Microbiological Industry and improving Providing the Population With and Meeting the Needs of Medical Pharmacy of Medicinal Remedies and Medical and Diagnostic Equipment [illegible] 1992, 1993 which was approved by the resolution of the Cabinet of Ministers of Ukraine [illegible]. The DNTsLZ performs the lion's part of the Program in the development of multi-made medicinal remedies. Because of the new [illegible] basis research in the field of developing medicinal remedies with their practical production the Ministry of Public Health of Ukraine and NAS of Ukraine Presidium signed on March [illegible] a joint order of collaboration. The DNTsLZ [illegible] with the MOZ (Ministry of Public Health) and NAS of Ukraine. Since then the DNTsLZ in addition to MOZ orders [illegible] has been conducting [illegible] research for a [illegible] medicinal remedies [illegible] NAS of Ukraine chemical institutes. For new medicinal remedies [illegible] new preparations, analytical [illegible] have been developed [illegible] with the Bioorganic Chemistry Institute, NAS of Ukraine. Further developments are being worked on jointly with the Organic Chemistry Institute, NAS of Ukraine. Original research is being

continuous contacts with other NAN of Ukraine institutions. The DNTsLZ has also been charged with functions of coordinating the work of Ukraine's institutions conducting preclinical studies, development of technical standards documentation and production engineering means of medicinal remedies. Because of the proclamation of Ukraine's independence the problem of creating our own systems of standardization and quality control of medicinal remedies has arisen. So in 1992 the Pharmacopeia Committee of Ukraine was created on the basis of the DNTsLZ. The Committee developed a "Statute of Registration of Domestic and Foreign Medicinal Remedies in Ukraine". It has reviewed 121 TPRs [expansion not given] and 59 [expansion not given] for domestically produced medicinal remedies; 64 of these documents were developed for the first time. The Committee has received documentation from 22 companies for 201 preparations, and 91 of them have already received permanent (for 5 years) registration. The current status and prospects of research along the main directions are constantly presented below in presentations by Center's leading specialists.

Ukraine: Directions of DNTsLZ Pharmacological Research

967C0091B Kiev FARMATSEVTYCHNYY ZHURNAL in Ukrainian No 5-6, Sep-Dec 94 pp 67-71

[Article by Doctor of Medical Sciences Professor [illegible], Manager, Age Pharmacology Laboratory, and Candidate of Medical Sciences [illegible] Chorna, Manager, General Pharmacology Laboratory, State Science Center of Medicinal Remedies; under the "First Congress of the World Federation of Ukrainian Pharmaceutical Societies" rubric; UDC [illegible]]

[FBIS Translated Text] DNTsLZ pharmacologists have always subordinated their research to urgent practical problems of public health. Because of this their interests extend to a large number of pharmacotherapeutic groups of medicinal remedies. Identification of flora, principally medicinal plants in Ukraine's flora and the use of efficient synthetic substances have made it possible to develop about 200 medicinal preparations, including new medicinal forms of known remedies, which are successfully used in various medicine fields—cardiology, neurology, gastroenterology, dermatology, nephrology, surgery, pediatrics etc. A lot of them are original remedies that have been repeatedly exhibited at international and Union exhibits and awarded medals, certificates and diplomas. Continuing and developing the best traditions of the Ukrainian school of pharmacologists, DNTsLZ scientists have been continuing the development of cardiovascular medicinal remedies; their main task. These are basically herbal preparations—individual alkaloids and glycosides, flavonoids, summary purified substance complexes and compositions with various active additives in various medicinal forms (injection solutions, pills, capsules and drops). Many cardiotonics used in CIS countries—digitoxin, corglycon and adonisid—were developed at the DNTsLZ. In recent years medium-active cardiac glycosides—celanide, digoxin and medilazide (a beta methyl digoxin) and strophanthin analog—have been implemented in practice. The following antihypertensive preparations have been developed: from rauwolfia—[illegible] and [illegible]—[illegible] and [illegible]; from [illegible]—[illegible] and [illegible], and liquid extract of Scutellaria baicalensis Georgi for treatment of non-complicated arterial hypertension. Antiarrhythmic remedies—rauwolfia alkaloid [illegible]—[illegible], and [illegible]—have been offered for medical practice. Antianginal remedies—[illegible] and [illegible]—which were developed earlier are still used in medical practice. Promising work is conducted on developing non-narcotic cardiotonics and complex preparations that contain synthetic substances, amino acids and plant extracts and therefore acquire a complex of pharmacological properties—antianginal, antihypertensive, antiarrhythmic and antiaggregative—which forms the basis for forecasting their high effectiveness in treatment of the ischemic cardiac disease and hypertension, as well as in prevention and treatment of infarctions and strokes. Serious attention is paid to development of medicinal remedies for treatment of chronic venous insufficiency. The DNTsLZ is the only institution in Ukraine and the CIS where research along this direction is conducted. A number of preparations in various medicinal forms for surgery and phlebology have been developed—[illegible] pills, [illegible] capsules, an [illegible] ointment and [illegible] gel [illegible]. An escin-based injection preparation is in final development stages; research is conducted on developing a group of preparations based on the extract from horse chestnut fruits. Taking into account the importance of microcirculation and capillary permeability in the pathogenesis of a large number of diseases including diseases of the venous system, Center's personnel has proposed flavonoid quercetin, an active regulator of these processes which has higher activity than rutin, and currently the work on modifying rutin in order to develop troxerutin-type preparations (capsules, a gel and injection solution) is in its final stages. Because of considerable spread of diseases of the digestive system medicinal remedies for their treatment have taken a leading place in DNTsLZ research. The first such remedy was flamin—a bile expelling preparation made from immortelle, which has

[illegible] in medicine for over 40 years. The extract of flavonoids and other herb remedies has caused the development of antiulcerous, hepatoprotective and tonic remedies. Vitamin is now coming. The former USSR's first antiulcerous preparation, had been developed at the DNTULZ. It was followed by original antiulcerous preparations made from liquorice, plantain and marigold—liquorice, flavoflex, plantaglucid and calefen. Calmagin or gastrolin, an antacid remedy for children, was developed. Herbal hepatoprotectors—flavoxin, cynarflavin, livarin, silibor (a liquorice and cactus mixture), liprolin (an extract mixture) and modified licorice bacteriosis Georgi flavoxin (a mixture form—have been offered for treatment of liver diseases. This group of preparations have mainly complex action—choleretic, antiinflammatory, spasmolytic and moderately bile-expelling, and they are actively influence metabolism in hepatocytes which provides a reliable clinical hepatoprotective effect. Laxatives have been developed by creating new remedies, as well as combinations of known remedies with different action mechanisms. Well known are improved medicinal forms of buckthorn—dry extract pills and syrup, laxoranda (a polysaccharide complex made of sea kale like bio-colloids, swelling action laxative), and combined preparations—vasiton and tablet (senosides—magnesia). Development of cholesterol enzymes and gastroenterose-based drugs is a new and promising direction. An important feature of the research is the use of twenty plant substances. The first preparation of this group are vitam (a vitamin mixture) which has high antiulcerous activity and is proposed for replacement therapy in the case of pancreas hypofunction, and aspirum, a prophylactic action enzyme used as an ointment form in dermatology and surgery. Nigedam, Ukraine's first tonic action phytoenzyme preparation, is manufactured. Based on these preparations, complex enzyme preparations for adults, children and the elderly (panzinorm, fermin etc.), analogs and original compositions have been developed. Pharmacological studies of inhibition and enzymes made from food plants have resulted in developing new antiflammatory, antiscorbutic and metabolism controlling preparations similar to gaudim. An important direction of DNTULZ work is development of injectable and nonsteroidal antiinflammatory remedies. As a result of DNTULZ research a number of concentrated preparations have been added in recent years to the arsenal of domestic medicinal remedies. Among them are various hydrocortisone, prednisolone, aminoxide fluoroquinone and tranexamic-based ointments, bactericidal glucosamide and cefotaxime and an injection preparation in the form of hydrocortisone suspension. A number of combined preparations with corticosteroids for dermatology and ophthalmology are being actively developed. VEMPO preparation has given Ukraine's first industrial production of corticosteroid ointments. Wide-scale pharmacological studies of analgesic, antiinflammatory and antipyretic remedies have been conducted in the 70's, as original preparations. Diclofenac, patented in several countries was developed and experiments in production. Following current international trends of research aimed at improving medicinal forms of already known preparations, that have shown good clinical results, the pharmacologists have focused their attention on the more active drugs in the group—acetylsalicylic acid, paracetamol, indomethacin and voltaren (ortofen). As a result rare was after a choice a solution form of acetylsalicylic acid and dexamethasone (DX) has activity comparable—approved for injection as well as in granules for suspension and in tablets, which has made it possible to reduce the side effects and broaden the scope of application of acetylsalicylic acid, including its application in urgent fields such as emergency surgery and prevention of myocardial infarction and strokes. Based on acetylsalicylic acid in combination with vitamin C new medicinal forms for adults and children have been developed. DNTULZ scientists consider extension of Ukraine's drug market with transdermal combined analgesics and antipyretics, first two-order cash. This has become an especially acute problem after manufacturing of these preparations that included voltaren, analgesiyum and phenacetin has been discontinued. Intensive pharmacological research made it possible to provide quick and high quality substitution of components of a number of new parenteral-different combined preparations and implement in practice health care of the domestic and possibly remedies such as analgesic, antipyretic etc. Some of them are more effective and safer analogs of popular preparations, such as analgesiyum, antipyrin and aspirin. This made it possible to virtually completely eliminate an acute shortage of non-narcotic analgesics in Ukraine and offer the population and medical institutions a wide choice of inexpensive mass-demand medicinal remedies. An important direction of Ukraine's work is development of medicinal remedies for correcting water-salt, protein and hormone metabolisms. Preparations in the group which are of marine herbal origin have hypocholesterolemic, diuretic, antiinflammatory and antiulcerous action. They are used in angiology and urology. These are preparations made of antigen (Ukraine—a representative) among sea dwelling coelenterates. As a result of meaningful selection of herbal and mineral components highly effective remedies for urolithiasis treatment—urinal, hepatoprotector, etc.—were created. Remedies have a specific

plant in studies of new medicinal remedies. The DNTALZ was USSR's pioneer in the field. Center's leading pharmacologists formulated theoretical foundations of aerosol action and developed a scheme of preclinical studies of aerosol preparations for inhalation and local application to a lung or skin form. Results of this work were implemented in preparation and in various medical fields—cardiologists, remedies against, adhesions, tracts and anesthesiologists preparations with antiseptics and regulators of lung cellular, cancer, complexes, insect aerosol, hypnotic-A and hypnotic-B. Development of basics of pharmacological research of local hormones which resolve in organism, in various forms based on modified cellulose, for surgical applications can be considered a priority direction. A biocompatible gauze, hemostatic viscose, microfibrils and napkins with antiseptics have been implemented in practice. Of great importance is microfiber surgical thread, matrix and other types of surgical threads that can replace surgical

Issues in Organizing Manufacturing of Pharmaceutical Aerosols in Ukraine

[illegible] *Kiev FARMATEKHNOLOGIYA ZHURNAL* in Ukrainian No 1-4, Sep-Dec 94 pp 70-71

Article by Doctor of Pharmaceutical Sciences Professor G.S. Barbina, Manager, Medical Aerosols Laboratory, State Science Center of Medicinal Remedies, under the "First Congress of the World Federation of Ukrainian Pharmaceutical Societies" rubric; UDK 615.09

[PBS Translated Text] Pharmaceutical aerosols which have certain action features and a number of advantages over other medicinal forms are in great demand in the world market. As the number of companies increases, production volume of pharmaceutical aerosols continuously increases. Their annual production increases by approximately 10 percent. In 1989 production per capita was 100 packages in the FRG, 19 packages in France, 61 packages in Italy and Japan, 13 packages in Great Britain, 0.07 packages in the former USSR and 0.05 packages in Ukraine. Production remains low mainly due to the universally recognized convenience and economic efficiency of using various medicinal substances in aerosol packaging. In recent years, after signing the Montreal Protocol on Protection of the Earth Ozone Layer, work on replacing fluorocarbon propellants with alternatives that do not destroy the ozone layer has been conducted in a number of countries. Production of pharmaceutical aerosols is less than 1 percent of the total aerosol production. And it should be noted that their chlorine content is approximately one-tenth of chlorine content in household aerosols. Thus, according to a report of the Environmental Protection Institute (USA) even a 70 percent reduction in the use of chlorine can provide the necessary reserve for their use in pharmaceutical aerosols. In October of 1990 the DNTALZ (DONDIKHF (Donetsk Scientific Research Chemical and Pharmaceutical Institute), as it was called at the time) was named the USSR's lead enterprise for development and organization of production of pharmaceutical aerosols. In cooperation with its Experimental Plant and AT (joint-stock company) "Vostok" (Kharkov) it developed and organized production of aerosol cans and valve-spraying systems, which made it possible to begin basic research on closing prescriptions of pharmaceutical aerosols with various action and methods for application. The majority of pharmaceutical aerosols manufactured in CIS countries were developed at the DNTALZ (15 items). These aerosols are used in various medical fields: cardiologists (nitroglycerin, propranol, bopranol, pavulon, cordiamin and hexamethonium sulfate aerosol), treatment of bronchial asthma (ventolin, salbutamol and thiazol aerosol), gynecology (bopranol, bopranol A, cordiamin and salbutamol) and treatment of burns (lysozyme, tonsil bopranol, bactericidal, dioxidin, dioxaphen etc.). In addition, in combination with AT "Vostok" an effective anti-ischemic remedy ARMO-1 was developed and delivered for production. The DNTALZ has been and still is the CIS main supplier of S&T developments of pharmaceutical aerosols. However, because there are no pharmaceutical aerosol-manufacturing enterprises in Ukraine these developments were being implemented at Russian Federation enterprises in Moscow, St. Petersburg and Bryansk. Only the DNTALZ Experimental Plant manufactures small quantities (up to 2 million packages a year) of lungs and salbutamol. In Ukraine there are necessary conditions for organizing our own production of pharmaceutical aerosols. Manufacturing of all valves and aerosols as well as glass aerosol cans is concentrated at AT "Vostok". Per a DNTALZ order NPP [illegible] with production enterprise "Priyut" (Bogorodchansk) built shelly and aerosol filling line with the annual capacity of 5 million packages. This is evidence for feasibility of organizing production of pharmaceutical aerosols at AT "Vostok" jointly with the DNTALZ, pharmaceutical company "Zdorovye" (Kharkov) and VO (production association) "Barbiturat" (Saky). Center's specialists are conducting studies on development of new effective aerosols for stopping a medicinal substance into the respiratory tract (nasal and respiratory tract cavities), aerosols, antibronchitic preparations, antiseptics, etc. (nasal), (oral) substances for dentistry, gynecology, proctology etc.

Ukraine: Work on Automation and Mechanization of Manufacturing of Medical Remedies

[illegible] *Kiev FARMATEKHNOLOGIYA ZHURNAL* in Ukrainian No 1-4, Sep-Dec 94 pp [illegible]

Article by Candidate of Technical Sciences V.M. Mikhin, Manager, Automation and Mechanization Laboratory, LAM, Senior Scientific Associate, LAM; B.I. Podolyanko, LAM Lead Engineer; A.P. Gorbenko and [illegible] Chernin, and V.I. Kudrin, Manager, Experimental

Development Sector State Scientific Center of Medicine Remedies under the Year Congress of the World Federation of Ukrainian Pharmaceutical Societies' rules. UDC 66.0[illegible]

[FBIS Translated Text] Traditionally DISTILLZ works on extraction and mechanisms has been related to science and production needs and concentrated mainly on developing certain devices and systems and new manufacturing equipment. In recent years the Center has developed and implemented in production a set for liquid gas extraction of lipophilic components and a pseudo-solvent. Having extractor laboratory equipment for manufacturing of medicinal forms for children, pastes and ointments and several devices for pharmacological research. A device for identifying genetic pattern of substance solutions has been developed. The device makes it possible to optimize a fairly complicated substance drying process and later to develop easy to maintain control system using a drying programmer. In 1996 a special drying center with demonstrations will be developed in conjunction with Department (Kiev). The center will have the capability of linear change of operation temperature and programmable control of cooling and heating rate. The Center offers to interested enterprises and organizations building the device and equipment it can manufacture.

Under development is a thermograph—a device that will make it possible to determine temperature of dehydration, rate of thermal decomposition and phase transitions, during heating, which will make it possible to get a better understanding of their physico-chemical properties and verify the optimum drying conditions, accelerate drying, avoid overheating of products, accelerate drying, avoid overheating of products and reduce waste. The thing is even determination of humidity using the method of uniformly drying of a constant mass of performed a sufficiently high temperature can produce a substantial rise to 25 percent error. The thermograph is designed for labs and factory laboratories of various industries. A system is being developed for automatic determination of the end of drying and for stopping drying units with based bar or supply SKS and IR-type dryers, cutting dryers etc. After the specified temperature is reached. The system will automatically determine the original humidity of a substance, compare it to the specified value and stop the process without operator's assistance. Along with the thermograph the system will make it possible to optimize the drying process and conserve energy resources. Beginning in 1995 the Center can accept orders for manufacturing such systems. A microwave liquid extractor with centrifugal phase separation has been developed. It has a 700 ml capacity and a 700-mlh coefficient of separation. It is designed for working with liquids that have high surfactant content and create strong emulsions in the pharmaceutical for complex manufacturing of solvent, caffeine, flavonoid, colloidal, digestive, tannin containing and other substances. The extractor is being tested at the DISTILLZ and pharmaceutical company Zdorovye (Kiev). Company's director Lavrov, Publication, Kharkov Technical University the Institute of Pseudomonas Institute and Installation Technology. MS extractor this extractor is cheaper to manufacture and operate, does not require a stable supply of liquids and has hydrodynamically operated extraction stages which provides a heavy phase pumping, along the operation without treatment. Pseudosolvent extraction from herbal raw materials has considerable advantages. Using different raw materials for production of pseudo. Ultrasonic extraction had been widely used, and the technology and equipment have been patented. A continuous action ultrasonic extractor with a 24 mgh capacity and complete loading of natural raw materials and extragent, mechanical loading of raw materials and also unloading is being developed. It will place on the extractor and remove gas, prevent extragent pulverizer during drying, and connect the apparatus for extragent processing of raw materials using various extragents.

Ukraine: Integration into World Community Via Computer Information Technologies

[illegible] Kiev *PARMATSEVTYCHNIY ZHURNAL* in Ukrainian No 5-6 Sep-Dec 94 pp 83-87

Article by K.K. Boldyrev, Manager, Computerization Sector SK; Doctor of Pharmaceutical Sciences Professor O.P. Prokopenko, Lead Scientific Associate Scientific Editor "Pharmacist" magazine, and N.P. Litvinova, Lead Engineer SK State Scientific Center of Medicine Remedies under the Year Congress of the World Federation of Ukrainian Pharmaceutical Societies' rules. UDC 621.[illegible]

[FBIS Translated Text] A more important condition for bringing Ukraine's pharmaceutical industry to the proper level is its integration into the world community. One of all through the development of a unified therapeutic industry information environment and telecommunication infrastructure. Having a good understanding of the role and importance of state-of-the-art computer information and telecommunication technologies the DISTILLZ has been making efforts in recent years along the direction, in view of became one of the country's first and the industry's first subscribers of a satellite system of data transmission of computer information (ASBIS) over a TV channel, now being down or at discount, computer newspaper "USE VSEM" (Something to Everybody) the author of the ASBIS technology and its newspaper founder—the International Recording Professors Institute NAS (Internet

Academy of Sciences of Ukraine, Kiev, and thereby it will also become the country's subject matter editorial board "Chemistry and Technology of Medicinal Remedies." In 1992 the Center founded and began publishing a monthly MIT bulletin (now a magazine) "PHARMACTIM" (PHARMAcy and PHARMAcology + CHMpute technologies and until UMmanitarian) aimed at developers, researchers, manufacturers and users of medicinal remedies. Thus, Ukraine's and CIS' first industry parochial publication was created, and it is not only published in the traditional printed format but also in a computerized form and is disseminated using the newest telecommunications method. Leaders of the world computer and telecommunications services market and its own experience made it possible for the Center to formulate a concept of creating in Ukraine a state-of-the-art information environment and telecommunications infrastructure that would be presented to the pharmaceutical community in the form of a plenary report at the independent state's first scientific practical conference "Problems of Development and Production of Medicinal Remedies in Ukraine" which took place in the city of Odessa in October of 1995. In developing the concept it was taken into account that at present there are basically necessary prerequisites in Ukraine, namely: authoritative scientific research organizations that traditionally have been oriented toward the development of medicinal remedies and have stable collectives of highly qualified scientists and specialists who over many decades have accumulated a lot of knowledge and experience in virtually all aspects of drug development and manufacturing in particular the DNTsLZ, NDSPT (separate not given), AMN of Ukraine, etc.; educational institutions and departments of higher education (UmFA (separate not given), Kharkov and Lviv Medical Institutes etc.); NAS of Ukraine SRIs that develop biologically active substances and medicinal remedies (IBOC (separate not given), IBMMD (separate not given) etc.) and MOZ and AMN of Ukraine SRIs that research and develop drugs (Ukrainian Therapy SRI, AMN of Ukraine; Ukrainian Pharmacotherapy of Endocrine Diseases SRI etc.); production (Derzhkomsudfarprom (the State Committee of Ukraine on the Medical and Biological Industries) and drug state enterprises that had been formed long ago); a working system for mass dissemination of computer information which covers the entire territory of the country (the electronic computer newspaper "CHE VIBIR"). In addition at the beginning of 1994 information appeared on starting the development of the National System for Data Transmission Via Telephone Communication Lines—UKRPAK. The most important tasks in solving the problem of creating the industry information environment and telecommunications infrastructure are: 1. Determine the head organization—the National Center of Pharmaceutical Information (which grew out of the former National Information Bank of Ukraine. Due to its status the DNTsLZ is the most suitable organization to play this role. 2. Pick from pharmaceutical SRIs and VUZs 8-10 base centers of pharmaceutical information (one for each 2-3 oblasts). 3. Commission the DNTsLZ and base centers, with participation of commercial enterprises, organizations and institutions, to develop a "Program for the Development and Expansion of the Information Environment and Telecommunications Structure in Ukraine's Pharmaceutical Industry for 1996-1997." 4. The Ministry of Public Health, Derzhkomsudfarprom and National Academy of Sciences of Ukraine must solve the problem of financing the development of the "Program" and allocate funds for creating in 1996-1997 the first phase of the National and Base Centers of Pharmaceutical Information.

The proposed concept was approved by Conference participants and incl[illegible] in the Conference resolution which is unfortunately non-binding. The great economic situation of both the industry and the country is not conducive to implementation of the suggestions. Using the opportunity of an important event in our industry, the 1st SPUPT (World Federation of Ukrainian Pharmaceutical Societies) Congress, we are calling again on managers, scientists and specialists of pharmaceutical enterprises, organizations and institutions of Ukraine to take active part in implementation of these suggestions. We are confident that the 1st SPUPT Congress will give a great impetus to integration of Ukraine's pharmaceutical industry into the world community. The "PHARMACTIM" editorial board as well as the DNTsLZ are always open to communication and will respond immediately to any suggestions or possible joint work in the field of information and managers in the pharmaceutical industry.

Ukraine: Development of Soft Medicinal Forms: Achievements and Problems

[illegible] *Kiev PHARMATSEVTICHNYY ZHURNAL* in Ukrainian No 3-4, Sep-Dec 94 pp [illegible]

Article by Candidate of Pharmaceutical Sciences L.I. [illegible], Manager Soft Medicinal Forms Laboratory State Scientific Center of Medicinal Remedies under the "First Congress of the World Federation of Ukrainian Pharmaceutical Societies" notes, "[illegible]

[illegible] Translated Text] Because it had the necessary structural units and qualified specialists the DNTsLZ was USSR's head organization in the development and industrial implementation of soft medicinal remedies and remains such an organization in Ukraine. In the Sci. Center's associates under the direction of M.D. Gorban and Yu.I. Khodzhaev developed and implemented

[illegible]

[illegible]

[illegible] in the form of soft gelatine capsules have a relatively low share among multi-vitamin medicinal remedies. DNTALZ specialists perform SQT management of their production but remedies in this form are only made at the Moldavy Novgorod Chemical Pharmaceutical Plant and St. Petersburg Production Chemical Pharmaceutical Association "Olainfarm". At present the Center has authorized standards documentation necessary for industrial production implementation of capsules with vitamin-mineral oil for children and capsules with solid vitamin mixes. Lavitlen is legendary multi-chalcogen-based hepatoprotective remedy. Apaphen (an analog—lipoxidol) on capsules are undergoing clinical testing.

Ukrainian Injection Preparations and Their Manufacturing Technology

UTAMBOVIC. Kiev FARMATSEVTICHNYY ZHURNAL in Ukrainian No 5-6, Sep-Dec 94 pp 94-98

[Article by Doctor of Pharmaceutical Sciences Professor P.A. Kuzmin, Lead Scientific Associate Candidate of Pharmaceutical Sciences V.M. Sokolova, Head, Injection Medicinal Remedies Department Candidate of Pharmaceutical Sciences B.I. Vishnyakov, and M.M. Tsyrlenko, Director DNTALZ Experimental Pilot Glass Science Center of Medicinal Remedies, USSR. [illegible]]

[illegible] Translucent Total Quality is the central problem in the development and manufacturing of injection solutions. Main quality factors are stability, sterility, absence of mechanical inclusions and apyrogenicity. The most important problem of practical pharmacy is an action of solvents for substances for parenteral application. The most widely spread solvent is water, however because of undesirable chemical processes (hydrolysis, oxidation, racemization etc.) a large number of medicinal remedies are unstable in solutions. The progress of these processes depends to a large extent on pH of the environment, the presence of catalytic ions of heavy metals and other factors. For a large number of therapeutically active compounds an unfavorable process is oxidation, the most prone to it are compounds containing chelated groups (vitamins A, carotenoid fatty acids and lipids), substances containing aldehyde carbon, glycosides, amide, uracils, acid and phenolic substituents and nucleotide groups, quaternary amine groups (atropine and alkaloids) etc. About 90 percent of manufactured solutions or ampules must be protected from oxygen. With the wide use of vacuum filling of ampules a method for sealing them in carbon dioxide, nitrogen or argon was suggested, which makes it possible to replace these gases for up to 95 percent of air above solutions in ampules. Another proposed equally original method for preventing solution oxidation is sealing ampules in a vacuum atmosphere using the fast vial fragmenting principle. Sodium sulfite and metabisulfite, thiourea, mercaptic acid etc. were used as antioxidants where the effect of heavy metals was neutralized by adding complex-generators (for instance, trilon B). Because a number of medicinal substances do not dissolve in water, non-water solvents PEG-400, propylene glycol, polyoxyethylenediol, ethylolate, glycerine etc. were used in the development of injection preparations (hormonal preparations, complex vitamins and diazepam). The use of non-water solvents makes it possible to control the level of concentration of therapeutically active substances in the organism. The quality of ampoule washing, free carrier filtering of solutions and filling and sealing ampules in a clean room environment are the main factors ensuring the purity of injection preparations. Membrane filters are the most widely used for clarifying dispersive systems. Over 50 different filtering materials (porcelain, fabric, fiber-glass etc.) were studied. It was found that as far as filter structure is concerned a number of dynamic membrane compounds, MGS, acetyl-cellulose—Vladipor, MFA-A and PTFE (polytetrafluoroethylene) filters—are very close to organoid Millipore membranes with 0.2 micro mesh. Interesting results of the effectiveness of filter membranes during interaction with an electric field had been performed. It turned out that in a stationary electric field both negative polyvinyl-hydrate colloidal, fluorophlor etc. and microorganisms located in a dielectric liquid flowing through the field polarized, as a result bacteria adhesion to the filter increases. Using this effect and a 50-60 micro mesh adhesive filter it was possible to obtain apyrogenic sterile water. In world practice there are two solution sterilizing methods—storage and vacuum. Both have positive and negative sides. The domestic industry widely uses the vacuum method. The essence of the process is washing the inside surface of ampoules is underwater injection of a liquid with ampoule walls during repeated circulation. The degree of ampoule cleaning from the chemical contamination depends on the degree of contamination adhesion to glass. A necessary condition of efficient ampoule washing is the force of breaking contamination away from the glass surface exceed adhesion forces. Experiments demonstrated that when using the vacuum washing method hydraulic forces at a flow rate of 25 mm/sec from 0.08 dn to a sphere or 4 dn to a capillary. It was found that at a 1 mm flow rate of hot 80°C water approximately 15 percent of the chemical particles will rise on ampoule walls but in the presence of a practically stationary water film on the walls. A so-called "wave contaminant" ampoule washing method was proposed. It is based on creating in a filled vessel a zone of supersonic waves and its consecutive. When water in an ampoule body meets water surface filled bubbles appear at the liquid-solid wall interface. They close and trigger a so-called "thermo contaminant effect" action. At the moment of its formation the near-wall liquid film heats, mechanical pressure is 1 break away from the wall and water flow carries them, away from the ampoule. The thickness of the near-wall liquid film decreases from 50-60 micro down to 12-15 micro, which considerably increases the process efficiency. Experiments demonstrated that when

[illegible] the steam condensation method to need a full water condensation cycle can be completed in 0.5 s. Together with industry's enterprises, new equipment has been developed, semiautomatic machines for aspirin sealing in an inert gas atmosphere (the 4[illegible]-K type) and steam condensation capsule washing (AP-[illegible]) and equipment for thermal capsule washing and solution filtering with automatic microgravimetric detection of mechanical particles. A number of preparations have been developed and implemented into medical practice using state-of-the-art technologies. Among them a 2-fperazin preparation, 1-percent dibazol, 10-percent aminon, 2-percent dexrazoxane, aspirinate, 1-percent nitroglycerine, 20-percent caffeine in ampoules, 2-percent hydrocortisone acetate suspension solution, aminosol in 5 ml bottles and lyophilized forms—fluorouracil, cytosine hydrochloride, mitomycin, dry antibiotic in bottles etc. In perspective, when developing new medicinal forms one first of all should be taking into account the mechanism of transporting medicinal substances through cell plasma membranes. Dissolved medicinal substances penetrate membranes either by themselves or with the help of carriers. Transport of medicinal substances without carriers is always slow and in the direction of the gradient of concentration, and the speed of the process depends on the value of the gradient, diffusion and temperature. Active transport requires external energy, as a result electric or osmotic work is performed in the system. The substance transformation energy can be the source of active transport. Most often carriers of medicinal substances are proteins that specifically bind substrates and transfer them through membranes. For purposeful delivery of medicinal substances into an organism one can successfully use microaggregates (0.5 mcm), microspheres (0.1-100 mcm) and nanoaggregates (10-1000 nm). Medicinal substances can also be transported using lipid emulsions, liposomes and magnet controlled systems. By reasonably combining low molecular components and performing this process on an industrial scale will shortly make it possible to develop new generation drugs.

Russia: 31-NMR Spectroscopic Study of Self-Association of Deoxyoligonucleotide Triphosphate dTpTpGpTpA Molecules in Aqueous Solution

[illegible] *Moscow BIOFIZIKA in Russian*
Vol. 40, No 2, Mar-Apr 95 pp 284-290

[Article by A.B. Vasiliev, L.N. Dyatkin, V.V. Rodionov, and V.A. Lorenz, Biological Instrument Institute, Orenburg, Ukraine; R. Pettit and D. Brown, University of London; received 21 Mar 94]

[FBIS Summary] One- and two-dimensional ^{31}P NMR spectroscopy ([illegible] MHz) were used to study the self-association of octameric deoxyoligonucleotide triphosphate 5'-dTpTpGpTpA molecules in aqueous solution in order to learn more about the influence of specific sequences of self-complementary oligonucleotides and to determine the structural and energy characteristics of their self-association in solution. In contrast to a previously studied octamer 5'-dApGpCpT, the positions of the thymine and adenine that form the central GS-site are reversed so that 5'-dTpTpGpTpA contains two sequences with pyrimidine-purine oligonucleotide base alternating. Data from two-dimensional homonuclear PMR spectroscopy (2D-COSY and 2D-NOESY) were used for complete assignment of oligonucleotide proton signals in the ^{1}H NMR spectrum. The concentration and temperature relationships of the deoxyoligonucleotide proton chemical shifts were studied to determine the structural and thermodynamic parameters of the molecular self-association in aqueous solution. The experimental results were analyzed using the dimer molecular association model. A comparative analysis of the thermodynamic characteristics of the self-association reactions of dTpTpGpTpA and dApGpCpT showed that these parameters are affected by oligonucleotide sequencing. The values obtained for the reaction constants suggest that the octamer dTpTpGpTpA, which has two pyrimidine-purine sequences, is thermodynamically more stable than the octamer dApGpCpT, which does not contain these types of sequences in the oligonucleotide sequence. Thus, thermal stability of the oligonucleotide duplex increases as the number of pyrimidine-purine sequences in the sequence increases. Figures 7, tables 3, references 15. [illegible] Russian, 12 Western.

Russia: Intelligentsia Distribution of Chlorine Terminated Ester α_1 During Change in the Lipid Bilayer Phase State

[illegible] *Moscow BIOFIZIKA in Russian*
Vol. 40, No 2, Mar-Apr 95 pp [illegible]

[Article by V.P. Zorin, I.S. Mikhaylovskiy, [illegible] and S.S. Chernavskiy, Biology Year University, Moscow; submitted 29 Dec 93]

[FBIS Summary] Fluorescence quenching was used to study the intramembrane distribution of chlorine terminated ester α_1 (TME), a hydrophobic, amphiphilic anesthetic, in unilamellar lipid vesicles prepared from dimyristoylphosphatidylcholine. The fluorescence spectra and degree of polarity were studied using an SLM-4000 spectrofluorometer. The effectiveness of the intramolecular quenching was determined from the change in TME fluorescence intensity when varying quantities of AQBS (azobenzene-2,6-disulfonic acid), a water soluble quencher, were added to the liposome suspension. The quenching constant (K_{sv}) and quenching rigorous molecular accessibility to the quencher (f_a) were determined using a modified Stern-Volmer equation. It was found that quenching effectiveness is determined

by the size, phase state and charge of the lipoxetine membrane, lipoxetine composition, and the chemical structure of the antioxidant. Small vesicles have more membranes with proportionally more volume than the outer layer. Thus, more peripheral molecules are located in the outer layer of the membrane. When the lipoxetine is in a gel state, 80% of the TMH molecules are located in the outer layer. If the layer is in a crystalline state, then 60% of TMH molecules are in the outer layer. AQDS tends to the surface of the lipid bilayer, and is therefore more effective when TMH is concentrated in the outer layer of the membrane. Increased density of peripheral particles significantly increases the probability of energy migration in the bilayer plane, as well as between fluorophore localized in the outer and inner lipid monolayers. This migration of energy may also be a factor in greater quenching effectiveness. Figures 5; references 10: 7 Russian, 3 Western.

Russian Kinetics of Fe^{2+}-Induced Lipid Peroxidation in Lipoxetine in the Presence of Ascorbic Acid: Concentration Effects of Fe^{2+} Ions

97[illegible] Moscow BIOFIZIKA in Russian
Vol 40, No 2, Mar-Apr 95, pp 191-[illegible]

[Article by Ye.S. Demina and V.N. Shipov, Scientific Research Institute of Physico-Chemical Medicine, Russian Ministry of Health, Moscow; submitted 9 Aug 93; modified [illegible] 19 Apr 94]

[FBIS Summary] The dependence of the rate of lipid peroxidation (LP) on the concentration of Fe^{2+} ions and the regulation of this process by inorganic phosphate ions were studied. Phosphatidylcholine isolated from egg yolks were suspended in a buffer solution of 100 mmol KCl, 20 mmol tris-HCl, pH 7.4. The samples contained 2.0 ml of the buffer solution, 2 mg/ml of liposomes and 1 mmol of ascorbic acid, to which 0.5 ml of acidified Fe^{2+} solution was added to initiate the reaction. The dishes were stirred and held at a constant temperature of 25°C. Changes in luminescence were measured using an FEU-100-based spectrophotometer apparatus. LP products were measured through the course of the experiment, using 2-thiobarbituric acid (TBA) as an indicator. The reaction between LP products and TBA results in a change in optical density at 532 and 600 nm. Analysis of the kinetics of TBA-active products showed that a surplus of ascorbic acid makes it possible to maintain a constant concentration of iron in such conditions. LP proceeds at a constant rate. In low concentrations Fe^{2+} ions primarily exhibit pro-oxidant activity. However, the LP rate stops increasing when a certain concentration is reached (50 μmol), beyond which the LP rate drops sharply, approaching 0 when Fe^{2+} concentration is at 500 μmol. Adding phosphate to the sample has the same effect as increasing the iron concentration. It appears that phosphate chelates the iron ions, reducing the amount of Fe^{2+} ions taking part in the LP reaction in the membrane. Earlier findings show that the rate of LP is determined by the concentration of Fe^{2+} ions bound to the membrane, rather than by the concentration of iron added to the solution. Figures 5; references 23: 4 Russian, 19 Western.

Russian Specific Effect of Super-High Frequency Pulse-Modulated Electromagnetic Field on Induced Potentials of Cat Brain Visual, Auditory and Sensory Cortexes Stimulated by Light and Sound

97[illegible] Moscow BIOFIZIKA in Russian
Vol 40, No 2, Mar-Apr 95, pp 4[illegible]-4[illegible]

[Article by Ye.A. Kiknadzhakov and A.F. [illegible], St. Petersburg State University; submitted [illegible] Jan 94]

[FBIS Summary] The author [illegible] a super-high frequency electromagnetic field (EMF) in order to determine the effect of electromagnetic [illegible] on induced potentials (IP). Experimental [illegible] was used to experimentally explore [illegible] results similarly in the primary projecting zone of the visual cortexes in both hemispheres of the [illegible] which were anesthetized with ketamine (100 mg/kg). An electrode was also implanted in the sensory region of the right hemisphere of cat [illegible] and in cat [illegible] an electrode was implanted in the secondary auditory [illegible]. After the [illegible] had recovered, the cats were placed in a bag and secured in a hammock inside an screened, sound-proof, [illegible] chamber to accustom the animals to experimental conditions. Three IPs were recorded without exposure to the EMF, then 9 were recorded during exposure to the EMF. A pulsed EMF with a carrier frequency of [illegible] MHz and a peak power of 500 μWcm was used. A significant change in the amplitude of IP occurred in the visual and sensorimotor cortexes. When the peak power of the EMF pulse was increased to [illegible] μWcm, the amplitude characteristics of IP changed in the [illegible] cortexes increased in the 50 and 100 seconds. In the visual cortex, the amplitude increased in the 50 seconds of the experiment. The IP of the two hemispheres of the visual cortex are asymmetrical in nature. This asymmetry may be attributed to the interhemispheric dominance of the sensorimotor formations of the left and right hemispheres. The change in IP amplitude may be related to the effect of EMF on cell membranes, which may produce changes in cell membrane receptors and transport activity, as well as alter the conditions and [illegible] interhemispheres. Figures 2; references [illegible]: [illegible] Russian, [illegible] Western.

[illegible] Resonance Mechanism for Sound Detection in Lateral-Line Systems of Fishes

[illegible] Moscow [illegible] in Russian
Vol. 40, No. 2, Mar-Apr 87, pp 443-447

(Article by I.Ya. Popov and S.L. Popova, submitted 25 Mar 85, revised [illegible] 12 Jan 86)

[FBIS Summary] A possible explanation for the mechanism by which sound is detected by the lateral-line system of a fish was proposed on the basis of incoming sound wave resonance and the acoustical expansion of a lateral-line system. The 'zero-width slit' model was used to construct mathematical models for 'surface' and 'channel'-type lateral-line systems, which were also identified qualitatively. It was found that a channel-type system can detect both the magnitude and the direction from which an incoming or 'slit' wave originates more precisely than a surface-type system. Under equal conditions, the resonance of a channel-type system are narrower than those of a surface-type system. This is due to the lower degree of expansion of the resonators comprising a channel-type system. Thus, when a sound wave strikes the body of a fish that has a channel-type lateral-line system, it excites an acoustical expansion that propagates along the channel. The resulting resonance depends on the resonance of the channel and on response to the direction of incoming wave origination. By aligning itself with the wave source in order to achieve the resonance effect, a fish can precisely determine the direction of an incoming wave. This study was partially funded by a Soros Foundation grant and by the Russian Academy of Natural Sciences. Figures 2, references 19: 4 Russian, 9 Western.

[illegible] Introduction to Issue Dedicated to Artificial Neural Networks

[illegible] Petersburg PRIBOROSTROYENIYE in Russian Vol 30 No 1-2, Jan-Feb 87, pp 1-4

(Article by M.F. Yakubov)

[FBIS Summary] This issue of the journal PRIBOROSTROYENIYE is intended to familiarize readers with publications on the theory of artificial neural networks and their use in applications for which classical methods are ineffective. Articles in this issue discuss mathematical models and algorithms in true neural networks and the use of neural networks in other problems involving combinatorial optimization, text and graphics processing, and mathematical physics equations. Another article analyzes CAD software used to design a neurocomputer based on a TMS320C30 signal processor. A morphological approach is taken to analyze artificial neural networks by comparing the properties of network models with the properties of true neurons and their associations, using the example of rhythmic brain activity and the workings of the respiratory center.

[illegible] Analysis of the Role of Rhythmic Activity of Brain Structures in Learning in an Experiment and in a Neural Network Model

[illegible] Petersburg PRIBOROSTROYENIYE in Russian Vol 30 No 1-2, Jan-Feb 87, pp 5-10

(Article by G.G. Shulgina, Institute of Higher Nervous Activity and Neurophysiology, Russian Academy of Sciences, Moscow, UDC 612.822.3)

[FBIS Summary] Rhythmic processes play an important role in brain functions. Artificial networks of neurons that emulate frequently exhibit rhythmic activity which may be used to simulate higher brain functions. This paper attempts to systematically examine information on rhythmic functionally processes of the central nervous system based on the literature, the author's neurophysiological experiments recording slow oscillations in potential and pulse activity of associative neurons and other brain structures during learning, and information on artificial networks with stimulating and braking elements. Oscillations in potential are caused by interaction of stimulating and braking effects in neurons. Alpha and Beta rhythms of the brain are discussed. Changes in the amount of order in the working of neurons during learning and changes in the degree of neuron excitation during learning are discussed. Thus rhythmic oscillations are observed in brain structures under conditions which require the transmission, processing, and representation of new information. Networks with and without rhythmic activity are contrasted. Figures 5, references 16: 12 Russian, 4 Western.

[illegible] Device To Control Hierarchical Neural Networks

[illegible] Petersburg PRIBOROSTROYENIYE in Russian Vol 30 No 1-2, Jan-Feb 87, pp 11-14

(Article by V.M. Yankov, O.Yu. Filatova, Samara State Pedagogical University, UDC 612.822.3)

[FBIS Summary] Specific controlling devices are needed to study the structural organization and control of multi-level hierarchical neural networks. A general statement of the problem is studied, and a specific solution to the problem of controlling neural networks is presented which uses the example of the two-level hierarchical neural network of the respiratory center. The structure of the respiratory center network is described. A mathematical model of a hierarchical respiratory neural network is developed on the basis of a system of differential equations which contain

a matrix representing the levels of hierarchy. Basic methodological aspects of the problem of controlling different clusters of a respiratory neural network for structure and parametric identification of mathematical models of hierarchical neural networks are examined in detail. It is found that the determination and assignment of the weight of an input effector on the clusters of the first and second levels of hierarchy are of key importance. Devices developed by the authors to regulate respiration are described. Figures 2; references 6: 2 Russian, 4 Western.

Russia: Solving Mathematical Physics Problems With Artificial Neural Networks

[illegible] St. Petersburg [illegible] on Russian Vol [illegible] No 1-2, Jan-Feb 95 pp 15-27

[Article by V. A. Soloukhin, Moscow, UDC [illegible]]

[FBIS Summary] This paper examines the construction of neural network algorithms to solve problems in mathematical physics, namely elliptical and parabolic equations. Elliptical homogeneous equations in second order partial derivatives are used to describe a steady-state temperature field in a conducting medium with a constant thermal conductivity. A parabolic equation describes thermal conductivity (diffusion) in a homogeneous solid body with a constant thermal conductivity or diffusion in a homogeneous isotropic medium [illegible]. The main concept is to replace the process of solving the differential problem with modeling in the neural network of a dynamic system described by an initial equation. Neural networks like the one constructed here are called weakly-linked or cellular networks. Structure, analysis and efficiency estimates are presented for the neural networks developed here. The results can be used to construct software and develop neural computer architectures. The method used here is not sensitive to initial conditions and computing errors. Figures 7; references 19: 9 Russian, 4 Western.

Russia: Neural Network Implementation of Differential Algorithm for the Distribution of Whole Number Resources

[illegible] St. Petersburg [illegible] on Russian Vol [illegible] No 1-2, Jan-Feb 95 pp 28-31

[Article by S.V. Semenov, UDC [illegible]]

[FBIS Summary] The problem of whole number optimization is examined. In these problems a limited number of indivisible resources must be distributed among several subsystems to achieve maximum overall efficiency. The problem is formulated in terms of optimal distribution of resources. The example of optimal distribution of military targets to maximize or minimize damage is considered. Parallel differential algorithms are proposed to solve the problem and neural network computing structures which may implement these algorithms are developed. Mathematical models of artificial neural networks are presented which efficiently place the algorithms in a parallel form. Estimates are presented of the accuracy and time-intensity of the algorithms, two closely surpasses the other in accuracy. Differential algorithms efficiently solve the problem of distribution of whole number resources and may be implemented in the form of neural network architectures. Neural network implementations substantially reduce the time-intensity of these algorithms and increase the size of problems that can be solved in real time. Figures 3; references 7: 4 Russian, 3 Western.

Russia: Isolation of the Center of the Image of an Object in the Analyzer Plane Using a Neural-Like Network

[illegible] St. Petersburg [illegible] on Russian Vol [illegible] No 1-2, Jan-Feb 95 pp 32-34

[Article by V.V. Yefimov, E.G. Mironov, V.V. Chernov, A.F. Mordvinov, Military Engineering Space Academy, St. Petersburg, UDC [illegible]]

[FBIS Summary] The most promising method of solving artificial vision problems, i.e. determination of the center of an object in real time, is the use of neural network paradigms which maximize parallel processing of incoming information. The problem was previously examined for the case of an object of a known shape. The problem of isolating the center of an image of an object of ignore unknown shape using a neural-like network is examined here. A neural network algorithm is proposed for a real-time solution. Each point of the image is assigned a potential (potential is inversely of the center of the image). The problem is then reduced to finding the maximum potential. A neural network implementation of the algorithm to solve the problem is examined. The architecture is shown in a figure. Experiments under using a software simulator of the proposed neural-like network showed that it works and has stable operating characteristics. The neural process is completed in several network steps. The center of an object image is determined with an accuracy of up to one matrix cell of the analyzer matrix. Figures 2; references 3 Russian.

Russia: Organization of Information Filling of a Neural Network System To Form Solutions

[illegible] St. Petersburg [illegible] on Russian Vol [illegible] No 1-2, Jan-Feb 95 pp 35-42

[Article by V.V. Pereginets, UDC [illegible]]

[FBIS Summary] This paper examines an approach to the organization of the filling of a neural network with information. The neural network [illegible] to solve computation problems. The example of determining the monitoring of a hypothetical object in a case of hypothetical objects is examined. The dependence of the

neural network system properties on the character of the information that has been submitted to the network as analyzed. This neural network decision-making system is considered a prototype of a neural network expert system. The paper ends by certain experimental results which make it possible to formulate a number of rules so that the minimum number of sets will provide complete solution of the required quality level. Reference: 1 (Russian)

Russia: Neural Network Classifier of Text Subjects

MASHINOSTROYENIYE *in Russian* [illegible] *pp* [illegible]

(Article by V.V. [illegible])

[FBIS Summary] This paper describes a neural network approach to the construction of a self-training natural language text subject classification system. The system is based on a self-organizing neural network and models the links between words in a sentence using the principle of the semantic closeness of words. The system has four work modes: training and formation of text subject descriptions, determination of the subject and formation of a subject descriptor, determination of the subject of user inquiry, search for texts satisfying the user inquiry. A text is classified based on analysis of the activity of network neurons. The system is designed to determine the subject of neural computing articles. The active library has 1430 texts, and the system contains 2000 neurons and about 40,000 links. The system can process 900 words/second, and the computer's performance level is 15 MFlops. On average four incorrect subject assignments occur for every 20 articles. Figure: 1; references: 7 (7 Russian, 2 Western)

Russia: Algorithm With Levenberg-Marquardt Optimization To Train Multi-Layer Neural Networks

MASHINOSTROYENIYE *in Russian* [illegible] *pp* [illegible]

(Article by I.B. [illegible])

[FBIS Summary] Neural network training is a multi-dimensional optimization problem. In the general case, training of neural networks is found to be a multi-extremal nonconvex optimization problem. Drawbacks of applying traditional algorithms to neural network training are described. A second-order optimization algorithm is proposed to train multi-layer neural networks with sequential links. The algorithm includes a rule to determine the initial values of network parameters. The direction of the step is determined for each neuron, similar to a reverse error propagation algorithm. A rule determines the value of the step at each neuron, distinguishing the algorithm from traditional reverse error propagation algorithms. When implemented on a computer, it does not require a large amount of RAM, and compared with traditional algorithms it has a high convergence speed. Computer experiment results demonstrate the advantages of this algorithm. A table compares the solution time, iteration time, and number of iterations needed to solve a sample problem using second-order optimization, reverse error propagation, one-dimensional optimization, and a search in a random direction. The second-order optimization is found to be twice as fast as a reverse error propagation or one-dimensional optimization algorithm. Table: 1; references: 9 (5 Russian, 4 Western)

Russia: Neuroemulator Software Package To Model Neural Networks in the Process of Developing Specialized Neural Computers

MASHINOSTROYENIYE *in Russian* [illegible] *pp* [illegible]

(Article by V.A. [illegible], I.B. [illegible])

[FBIS Summary] The Neuroemulator software package is described. It models multi-layer neural networks whose structure and parameters are provided by the user on a personal computer. This is one of the first attempts to construct a generalized emulator for experiments with neural network mathematical models in the creation of specialized neural computers. The product was specifically designed to develop an experimental neural computer for pattern recognition. The package performs multi-layer network training, the creation of training samples, and the use of various training methods. The package has continuing procedures and can determine the network's responsibility to noise and computing errors. One can interactively combine, train, and study multi-layer heterogeneous neural networks with completely sequential links between layers. One can set the type and dimensions of input and output signals, the number of layers, the number of neurons in each layer, the type of activation function, and its parameters. Fig: one; 2; references: [illegible] (7 Russian, 4 Western)

Russia: CADS of Cadence Design Systems Inc. To Design Systems Based on Artificial Neural Networks

MASHINOSTROYENIYE *in Russian* [illegible] *pp* [illegible]

(Article by D.V. [illegible], [illegible])

[FBIS Summary] A hardware and software complex developed at the Medical Science and Technology Center is described. It is based on the Cadence CADS products by Cadence Design Systems Inc. and uses a training module produced by IBM. The software can design

digital, analog, and analog-digital devices on printed circuit boards. It can design programmable PLD and FPGA logic circuits and semi-customized LSI circuits. Software modules which implement these functions are described. The software uses the Verilog logic level language. The software is implemented on Sun Microsystems Inc. workstations running under UNIX. The software makes it possible for a team of designers to create neural network designs and complete the entire cycle of work needed to create an end product, from synthesis of neural network topology to the synthesis of neurology topology in a compressed period of time.

Russia: Hardware Implementation of a Neural Calculation Accelerator

[illegible] *St. Petersburg PRIBORY I TEKHNIKA EKSPERIMENTA* in Russian Vol 38 No 1/2, Jan-Feb 95 pp 63-67

[Article by A.V. Bochkarev, A.S. Gorshkov, M.V. Zakharov, A.I. Pogorelov, L.Ye. Polonnikov, Moscow, UDC 612.82]

[PRIS Summary] An accelerator board is described which accelerates neural calculations using four Intel TMS320C40 single-chip signal processors. The processor consists of a central processor, direct memory access coprocessor, memory and six communication ports. The board contains 5 MB of fast memory and provides a speed of up to 1000 Mops and 200 Mflops. There are configuration methods which make it possible to increase the speed and capacity of memory using several neural calculation accelerator boards. Neural algorithms are analyzed and an architecture and hardware for a neural computer are selected based on digital computing equipment. The accelerator board provides a 15-fold increase in processing in the recognition of turning objects on a turning background compared to an IBM PC/AT 486DX, 66 MHz when one board is used, and a 45-fold increase when three accelerator boards are used.

Russia: Photodynamic Therapy for Malignant Tumors in the Main Locations With the Drugs Photogem and Photosan (Results of a Three-Year Follow-Up)

[illegible] *St. Petersburg VOPROSY ONKOLOGII* in Russian Feb 97 Vol 43 No 2 pp 194-199

[Article by V.V. Sokolov, Ye.F. Stepanidin, N.N. Zhdanova, R.I. Yakubovskaya, Ye.V. Filonenko, and T.A. Astrakhankina, Moscow Scientific Research Institute of Oncology under P.A. Gorizov, Russian Federation Ministry of Health Care and the Medical Industry, Moscow, and General Physics Institute Russian Academy of Sciences, Moscow]

[PRIS Summary] The efficacy of the Russian photosensitizers Photogem and Photosan in treating malignant tumors was evaluated in a three-year follow-up study. From 1992 through 1995, the method of photodynamic therapy was used to treat 793 tumors in 299 patients. Photogem served as the photosensitizer with 176 of the patients (364 of the tumors), and Photosan was used in the remaining 79 patients (242 tumors). The locations of the tumors were as follows: skin, 49 patients (49 tumors), mammary metastases of the breast and metastases, 40 patients (200 tumors), nasal cavity, throat, trachea, or bronchi, 84 patients (199 tumors), lower lip, oropharyngeal cavity, or nasopharynx, 23 patients (29 tumors), esophagus, 79 patients (119 tumors), stomach, 23 patients (29 tumors), urinary bladder, 11 patients (35 tumors), vulva or cervix, 7 patients (7 tumors), colon, 1 patients (1 tumors), and other, 4 patients (5 tumors). The effectiveness of the photodynamic therapy was evaluated on the basis of visual, endoscopic, ultrasound, x-ray computed tomography, and morphological studies. The pharmacokinetics of elimination of the photosensitizers from patients' tissues and the effect of photodynamic therapy on the functional status of cancer patients' vital organs and systems, antioxidant, and immune systems were also studied. Photodynamic therapy resulted in complete tumor regression in 40.9 percent of the patients suffering from basal cell carcinoma of the skin, but it was most effective in patients with early forms of cancer of the hollow organs. Complete tumor regression and clinical remission was achieved in 100 percent of patients with early cancer of the mouth, trachea, bronchi, and urinary bladder, as well as in 89 percent of patients in the early stage of esophageal cancer and 79 percent of patients in the early stage of early stomach cancer. In the group with incurable malignant or metastatic tumor processes, local photodynamic therapy resulted in complete tumor regression in 20.4% patients of patients. The best results were obtained in cases of intraductal breast cancer metastases and melanoma. In no case did photodynamic therapy result in noticeable acceleration of residual tumor growth or progressive metastatic processes. In the patients treated with Photogem, fluorescence contrast between tumor and normal tissue 48-72 hours after administration of the medicine generally ranged from 2.1 to 9.1 (in isolated cases from [illegible] to [illegible]). In the patients treated with Photosan, fluorescence contrast between tumor and normal tissue 48-72 hours after administration of the medicine generally ranged from [illegible] to 9.1 (in isolated cases up to 9.1). The photosensitizers did not cause serious complications. The main complications were as follows: first-degree erythema in eight patients, allergic dermatitis in one patient, gastric bleeding 1 day after the photodynamic therapy in one patient, exudative stenosis of the throat and esophagus in five patients, and nodular photodermatitis on the backs of the hands of two patients. The concentration of photosensitizer in the patients' bodies was highest 1-3 hours

after injection and decreased slightly by 24 hours after injection, after which time the level of oxygenase fluorescence of the affected leaves continued to decrease very slowly over the next 4-5 months. Table 4.

Russia: Device To Obtain Drop Diffusion of Cereal Leaves

[illegible] St. Petersburg MEKHANIZATSIYA / ELEKTRIFIKATSIYA SELSKOGO KHOZYAISTVA in Russian
Vol 29 No 2 Mar-Apr 95 pp [illegible]

[Article by V. P. Lapshina, A. A. Avetisyan, T. D. Panchenko, All-Russian Scientific Research Institute of Phytopathology, Russian Academy of Agricultural Sciences, Moscow Oblast, UDK [illegible]] [illegible] manuscript received [illegible] Apr 94]

[FBIS Summary] This paper presents an improved method of obtaining drop diffusion from cereal leaves. The device consists of an evaporation chamber and holder, a drop holder made of a Teflon frame which does not contact the leaves but holds large (up to 20 µl) drops, a drop collector which reduces the risk of damage to the leaves, and a filtering extractor to remove remaining insecticide spores from the diffusate. This device can be used in a whole wheat plant. The evaporation chamber transfiltrates leaves to insecticide dust and locally moisturizes the air with more paper filters in this zone. The chamber is made from a plastic Petri dish [illegible]. The placement of the device is described. The use of the filtering drop collector is described. The liquid collector is graduated to measure the volume of diffusate. Combining drop collection and filtering simplifies the method and makes the process more efficient. This device can be used in field and laboratory conditions. The authors describe its use in small rye monocultures. Figures 2, references 6: 5 Russian, 1 Western.

Russia: Changes in Sensitivity to Phenylamide Fungicides in the Annual Development Cycle of Potato Late Blight Agent

[illegible] St. Petersburg MEKHANIZATSIYA / ELEKTRIFIKATSIYA SELSKOGO KHOZYAISTVA in Russian
Vol 29 No 2 Mar-Apr 95 pp [illegible]

[Article by V.V. Malenov, S.L. Tsvetov, All-Russian Institute of Plant Protection, St. Petersburg, UDK [illegible]] [illegible] manuscript received [illegible] May 94]

[FBIS Summary] Annual observations of the dynamics of resistance of phytopathogenic oomycetes to metalaxyl during the vegetation period indicate that at the end of the season, even when there is poor development of phytophthora, there is a sharp increase in the resistance level of the pathogen population in the plants. Resistance forms primarily until spring and can act as the source of the resistant mycelium in the new vegetation period. However, the first manifestations of the agent in a season were very sensitive to fungicide. Infected tubers were suspected regulators after collection for resistance level and rate of growth. The study continued from harvest to the following spring. In spring, the selected tubers and selected seedlings were planted. The first spots were highly sensitive to metalaxyl. Later isolates gradually increased their resistance. It was found that the most vulnerable stage of development for the fungus is its slow density growth period in the soil and in seedlings where the length of new generation is long (90 days). At this point the fungus may suffer greatly. Damage to the resistance genes. At the end of the season the generations are shorter (as low as three days) and their numbers may help resist the fungicide. Figures 2, references 9: 2 Russian, 7 Western.

Uzbekistan: Alkaloids and Their Phosphorated Derivatives As Regulators of Cholinesterase Catalytic Activity in Insects

[illegible] Tashkent KIMYOVIY PREPARATLARI SINTEZI in Russian
No 2 Mar-Apr 95 pp [illegible]

[Article by E. Tovaboev, Kh. Kh. Kasimov, I. K. Abdullayev, D. N. Dustov, A. S. Sadykov, Institute of Bio-Organic Chemistry, Academy of Sciences of the Republic of Uzbekistan, Tashkent, UDK [illegible]] [illegible] manuscript received 24 Oct 94]

[FBIS Summary] It is reported that insecticide toxicity is linked with the insecticide's ability to block the catalytic function of hydrolytic enzymes, primarily cholinesterase. Currently, esters of the vinyl alcohol and sulfinic acid are determine whether hydrolases belong to the cholinesterase class. The structure of a substrate may be responsible for binding with the active center of the catalytic center of cholinesterase. The kinetic parameters of the interaction of a number of substituted sulfinic alcohols and their derivatives with the cholinesterase of various insects is studied structurally and functionally. The following substitutions were used: piperidine, morpholine, anilinoethanol, chloroethanol, 2,4-hexadiene, 2,3-butadiene, and derivatives of [illegible]-dialkylthiophosphoric acid and 2-oxo-2-hydro-4-methyl-1,3,2-dioxaphosphorinane. Selectivity was found to be a strong inhibitor of the cholinesterase of flies. The structure of the active part of the cholinesterase of flies is more extensive and accessible for the phosphorus of complex cyclic structures. Organophosphorus cholinesterase inhibitors containing alkenyl molecules were studied. A derivative of [illegible]-dialkylthiophosphoric acid was found to cause the strongest anticholinesterase activity. Replacement of piperidine with morpholine in the structure of the organophosphorus compounds led to a drastic reduction in activity. A compound in N- or N,N-monoalkylanilinoethanol fragment had a distinct inhibiting activity. All the compounds had a blocking effect in

the hydrolysis of sucrose in the presence of yeast invertase. The differences in activity are attributed to differences in structure. Figures 1; tables 5; references 9: 7 Russian, 2 Western.

Uzbekistan: Basis of the Technology of Obtaining Cotton Protein

[illegible] Tashkent KIMYO PERIODICHESKIY SOVERSHENST' in Russian
No 2, Mar-Apr 95 pp [illegible]

[Article by T.I. Yusupov, Institute of the Chemistry of Plant Substances, Academy of Sciences of the Republic of Uzbekistan, Tashkent, UDC 547.962.5; manuscript received [illegible] Apr 94]

[FBIS Summary] Cottonseed oil cake is used as a feed and basis as a source of protein in feed. A technology for obtaining biologically valuable cotton protein is sought. The problem of gossypol is addressed. It is toxic when it is not completely bound, but binding causes the nutritional value of the feed, and it cannot be digested by young animals. Fractionation of proteins with various gossypol contents is discussed. The technology involves extraction of the most valuable part of the protein, cleavage of the required bonds of protein additive, creation of a mixed pulp, and the use of the waste water to produce feed yeast. Gossypol content of the end product depends on the feed form of the protein additive, but on average is an order of magnitude lower than in the initial cottonseed oil cake. Cotton milk was used to replace 10 percent of whole milk given to calves. They grew normally. The end product can be in fresh, frozen, preserved, or powdered form. Tables 2; references 22: 17 Russian, 5 Western.

Uzbekistan: Halogen Derivatives of Imperatoline and Their Hemostatic Action

[illegible] Tashkent KIMYO PERIODICHESKIY SOVERSHENST' in Russian
No 2, Mar-Apr 95 pp [illegible]

[Article by [illegible] Shakirova, R. Shchakirov, Yu.R. Mirzoev, Institute of the Chemistry of Plant Substances, Academy of Sciences of the Republic of Uzbekistan, Tashkent, UDC 547.[illegible]; manuscript received 7 Nov 94]

[FBIS Summary] The chloroxi imperatoline and its derivatives have a high M chloride blocking activity. This paper describes the synthesis of a series of halogenated imperatoline derivatives and determination of their chloride-blocking action. The initial species of the imperatoline were analyzed. The following derivatives were obtained: bis-chloroimperatoline, 3-chloroimperatoline, bis(chloroimperatoline), and 3-chloroimperatoline. The last of these is identical with a known chloroimperatoline. The structure of the other new compounds is described. Comparison of the pharmacological activity of the halogenated derivatives of imperatoline with a standard M-blocker anapsin showed that as in the case of imperatoline the derivatives exhibited a high hypotensive activity in the M subtype of chloride receptors. The compounds vary in the degree of antagonism toward carbacholine hydrocarbon. Figure 1; table 1; references 6: 5 Russian, 1 Western.

Uzbekistan: Cytochemical Reactions of Liver Nuclei of Animals Subjected to Growth Factor T-46

[illegible] Tashkent KIMYO PERIODICHESKIY SOVERSHENST' in Russian
No 2, Mar-Apr 95 pp [illegible]

[Article by G. Kh. Samsonova, E. A. Tursunov, Z. Sh. Khidoyatova, A. S. Sadykov Institute of Bioorganic Chemistry, Academy of Sciences of the Republic of Uzbekistan, Tashkent, Tashkent Medical Institute, UDC 612.[illegible]; manuscript received 7 Nov 94]

[FBIS Summary] This paper studies the mechanism of the effect of growth factor T-46 on liver nuclei after a single administration of the growth factor to rats. The cytological and functional reactions are studied. Stained smears of hepatocyte nuclei were macroscopically examined. Electron microscopy revealed that the nuclei were pure and retained their integrity. There was a small increase in nuclear volume and the number of nucleoli and chromosomes due to karyolysis, and nucleomegalia in the nuclei, indicating increased activity of nuclear structures. Biological studies focused on the rate of specific nuclear synthesis of glycoproteins. The lipids rate of production is continuous. The rate of production of glycoproteins increased by nearly a factor of two in the presence of T-46, probably due to the increased activity of some enzymes. The synthesis activity of the nuclei correlated with the increase in the number of nucleoli and the nucleomegalia of nuclei. Growth factor T-46 penetrates cell membranes and the nuclear membrane of hepatocytes, increasing the rate of nuclear protein synthesis, nucleomegalia in the nuclei, as the number of nucleoli. These findings may serve as the basis for a test of the degree of toxicity and physiological activity of T-46. Figure 1; references 6: 5 Russian, 1 Western.

Russia: Construction of Recombinant Phage DNAs Producing a ssDNA Probe To Identify Bacillus anthracis Strains Carrying the pXO1 Plasmid

[illegible] Moscow BIOTEKHNOLOGIYA in Russian No 5-6, May-Jun 95 pp [illegible]

[Article by V. B. Tsvetkov, V. S. Zaimovsky, A. S. Lipovsky, Volgograd Scientific Research Anti-Plague

[illegible] UDC [illegible] (manuscript received 26 Apr 95)

[FBIS Summary] To simplify the procedure of DNA testing of anthrax strains this paper constructs recombinant phage ZATN which produces a single-stranded species-specific anthrax DNA probe. The article details the cloning of the species-specific fragment of the anthrax plasmid pBA01 in phage vector M13mp18, expression of the single-stranded matrix of recombinant phage ZATN and alternative DNA probes. The substitution primer rebuilding method is used to obtain the ZATN-B DNA probe. The probe makes it possible to differentiate the anthrax pathogen agent from other representatives of the Bacillus genera. The ZATN-N DNA probe is obtained using rebuilding of a sequencing primer, which makes it possible to identify the Bacillus anthracis strain which bears the pBA01 plasmid. This approach produces DNA probes with a high specific radioactivity. The DNA probe procedure takes no more than 18 hours. Figures 5 tables 1 references [illegible] 4 Russian, [illegible] Western.

Russia: Expression of a Gene Encoding a Soluble Part of the CD4 Receptor of Human T-Lymphocytes in E. coli

[illegible] Moscow BIOTEKHNOLOGIYA in Russian No 3-4, May-Jun 95 pp [illegible]

[Article by T.V. Tokmachenko, I.V. Kurochkin, S.A. Nikolaenko, M.A. Elizarov, R.G. Vasyutin, Biotechnology Center, Russian Academy of Sciences, Moscow. UDC [illegible] (manuscript received 24 Apr 95)]

[FBIS Summary] Eight coding regions have been identified in the HIV virus. One of them, env, produces the glycoprotein gp120 with alternating variable and highly conservative sections. The highly conservative section of the C-end of gp120 can interact with the surface receptor of T-lymphocytes, protein CD4, damaging intercellular interaction and consequently, human immune response. Interaction of gp120 and CD4 helps the virus penetrate into the cell. Synthetic compounds are being sought to prevent binding of gp120 and CD4. Recombinant protein sCD4 inhibits the formation of multicellular aggregates of T-lymphocytes formed in HIV infection. It may be possible to use sCD4 with AZT and other antiviral agents. To obtain recombinant protein which corresponds to the soluble part of the CD4 protein of the human T-lymphocyte receptor, two expression plasmids are constructed which synthesize two polypeptides in E. coli cells. The two polypeptides are 183 and 181 amino acid residues long and correspond to the N-end region of the CD4 protein. The final yield of protein synthesized under the control of the T7 promoter vector pET7ab in the strain BL21(pLysS) was 1040 mg/l. A method is presented which makes it possible to obtain very pure forms of both derivatives of the soluble part of the CD4 protein. The recombinant protein (183 amino acid residues long) was used to obtain polyclonal antibodies to the CD4 receptor of human T-lymphocytes. Figures 5 references [illegible] Russian, 10 Western.

Russia: Modification of Oligodienes by Vanadium

[illegible] Moscow BIOTEKHNOLOGIYA in Russian No 3-4, May-Jun 95 pp [illegible]

[Article by S.V. Bondarev, A.Yu. Krasnopolsky, T.I. Lavrichenko, D.G. Pobedimsky, Kazan State Technological University. UDC [illegible] (manuscript received [illegible] Mar 95)]

[FBIS Summary] Oligodienes are organic hydrocarbon rubbers widely used in the rubber industry to make tire elastomers. They are used as plasticizers for high molecular rubbers. Oligodienes have various functional groups, and these can be supplemented. However, the method has many organic performance at high temperatures, and is costly. An alternative is microbiological transformation of organic compounds. This paper explores the possibility of transforming oligodienes with yeasts. The transforming capabilities of three strains of yeast were studied: Saccharomyces cerevisiae, Candida tropicalis, Candida utilis BKM Y-2527 and Candida utilis VKM-65. S. cerevisiae cannot be used in this manner. The yeasts of the Candida genera have a hydrolytic activity in oligodienes (above permanganate), and oligodienes reduce permanganate. Biosynthetic reduction process depends very slightly on the nature of the organic solvent used. The differences of modification in products affected by the oligodienes' reducing of the solvent. In transformation I (hydrolysis) group were found in the presence of Candida and in group II the hydrolysis group content was higher than the control concentration. Analysis of the biosynthesizing activity of the two Candida strains shows the C. utilis was more active, probably due to its higher metabolic activity. Oligodienes above permanganate is better suited to microbiological hydrolysis than oligodienes reduce permanganate, probably due to the microstructure of the oligomeric. Tables 4 references 10 [illegible] Russian, [illegible] Western.

Russia: Identification of Antibiotics From Lactobacilli

[illegible] Moscow BIOTEKHNOLOGIYA in Russian No 3-4, May-Jun 95 pp [illegible]

[Article by [illegible] Ramazanov, N.N. Gorelova, N.N. Kondratyeva, Institute of Microbiology and Virology, Ukrainian Academy of Sciences, of the Republic of

Kazakhstan, Almaty: UDC [illegible] (manuscript received 28 Apr 95)

[illegible] Summary: Information is presented on primary identification of an antibiotic, complex made from culture of *Lactobacillus* bacteria. The isolated antibiotic is distinguished by a broad spectrum of antimicrobial activity. The strain was isolated from sour cream of [illegible]. The bacteria has a tendency to form chains. It is Gram-positive, catalase-negative, aerotolerant, and microaerophilic. It is self-fermenting, and grows well in a synthetic medium with mineral water. Optimal growth is observed at 37°. The bacteria has proteolytic activity and synthesizes vitamins B$_2$ and C. The antibiotic substance was identified by determining its antimicrobial spectrum, with thin-layer chromatography, and with spectrophotometry. The antibiotic activity was determined using diffusion into agar for 27 test microorganisms (Gram-positive and Gram-negative, acid-resistant bacteria, yeasts, mold-like fungi, and saprophytes. The antibiotic was found primarily in the biomass and to a lesser degree in the culture liquid. The antibiotic complex consists of no fewer than two components, the active components in the biomass and one in the culture liquid. Only one was tested due to insufficient quantity of the other. The antibiotic is believed to be a low-molecular substance that is protein in nature. The antibiotic suppressed the growth of some of the test microorganisms. Figures 2; table 1; references 5: 3 Russian, 2 Western.

Russia: Isolation of Superoxide Dismutase Using Free-Flow Electrophoresis

[illegible] *Moscow BIOTEKHNOLOGIYA in Russian* No 3-4, May-Jun 95 pp 23-26

[Article by O. I. Lomova, V. V. Gnuchev, Ye. S. Vinogradov, A. V. Gorodnichev, State Scientific Research Institute of Applied Microbiology, Obolensk, Moscow Oblast; UDC 57.083.3:[illegible]; manuscript received 19 May 94]

[illegible] Summary: Superoxide dismutase (SOD) scavenges the O_2 radical, and has been successfully used in the treatment of rheumatoid arthritis, immunitial inflammation and lung ailments. This paper describes the development of a method to isolate and purify SOD from bovine erythrocytes with the use of free-flow electrophoresis in the final stage. Blood was heating at 55-60° in order prior to the free-flow electrophoresis to remove an albumin a thermolabile protein. This process removes the hemoglobin fraction from the SOD. Advantages of the use of free-flow electrophoresis are the mild conditions of the isolation of the native molecules, and the fact that the process is continuous. A purification technique is developed which yields a fraction with an 80-90 percent SOD content. The production level is 20-30 mg/hr. This is an alternative to the traditional technique using preparative chromatography. Figures 4; table 1; references 10: [illegible] Russian, 2 Western.

Russia: Comparative Efficacy of Rifampicin Administered Parenterally and Orally To Treat Experimental Plague in White Mice

[illegible] *Moscow ANTIBIOTIKI I KHIMIOTERAPIYA in Russian* Jul 95 Vol 40 No 7 pp [illegible]

[Article by L.N. Maksimenkova, V.V. Rozhkova, V.A. Zenkova, O.K. Bogatyrev, V.V. Pavlenko, I.P. Frolova, and S.M. Novoselov, Antiplague Scientific Research Institute, Rostov-na-Donu, and State Center for Research in Antibiotics, Moscow; manuscript received 1 Apr 95; UDC [illegible]]

[illegible] Summary: The efficacy of orally administered rifampicin in the treatment of experimental plague was compared with that of parenterally administered rifampicin. The comparative study was performed in nonvaccinated white mice weighing 19 to 20 g each; the test bears infected either subcutaneously or aerogenically with between 8- and 70-times the median lethal dose of plague microbes. Rifampicin administration was begun 24 hours after the animals had been infected. The rifampicin was administered both parenterally and orally for six seven times at 24-hour intervals and then once at 24- and 48-hour intervals in doses of 0.25, 12.5, and 25.0 mg/kg. All animals were observed for 30 days. The effectiveness of the different forms of rifampicin was measured by the survival rate of the mice in the experimental and control groups. Each group contained 10 mice and each experiment was repeated two or three times. It was determined that rifampicin administered in the optimum dose (25.0 mg/kg) for 5-7 days at 24-hour intervals is equally highly effective in treating plague regardless of whether it is administered via the parenteral or oral route. When rifampicin was used at lower doses (0.25 to 12.5 mg/kg) or for shorter periods of time, the parenteral route of administration was more effective. Specifically, when rifampicin was administered in doses of 0.25 and 12.5 mg/kg, between 70 and 100 percent of the animals receiving the drug via their injections survived versus only 30 percent of the animals receiving the same doses of drug orally. It was therefore recommended that rifampicin be administered via injection to treat the most severe forms of pneumonic plague. Tables 2; references 6: 4 Russian, 2 Western.

Russia: Bioregulatory Activity of a Biofoide Bacillus Culture Biomass Preparation

[illegible] *Moscow ANTIBIOTIKI I KHIMIOTERAPIYA in Russian* Vol 40 No 1 May-Jun 95 pp [illegible]

[Article by E. P. Kovalev, L. N. Lomova, V. V. Kuznetsov, A. N. Vinogradov, T. M. Sadykov, Moscow Medical

Academy, UDC [illegible] manuscript received [illegible] Apr 94]

[FBIS Summary] Rhodiola rosea tissue culture is used to develop a preparation with a hepatoprotective effect on carbon tetrachloride intoxication. The tissue culture was found to be a satisfactory replacement for the natural plant extract. The preparation, RR-1, has a distinct stimulating effect on the central nervous system, decreasing the duration of hexobarbital-induced sleep in rats. Numerous days of administration of RR-1 did not lead to an intensification of the effect compared with a single administration. The stimulating effect of RR-1 on the central nervous system is not prolonged, and disappears completely in one day. RR-1 has a definite hepatoprotective effect at CCl_4 intoxication. In addition to reducing inflammation in the damaged organ (the liver), the preparation reduces the levels of alanine aminotransferase, aspartate aminotransferase, cholesterol, and bilirubin in the blood and also reduces the hemoglobinic indicator. There are no distinct dystrophic changes in liver tissue. Tables 2, references 10 (8 Russian, 2 Western).

Russia: Vasoactive Effects of Neuropeptides

MOSCOW [illegible] St. Petersburg *FIZIOLOGICHESKIY ZHURNAL IMI IM. SECHENOVA* in Russian Jun 95 Vol 81 No 6, pp 29-47

[Article by S.A. Polunin, D.P. Doronin, and G.V. Chernyavskaya, Digestion Physiology Laboratory (head, S.A. Polunin) and Blood Circulation Laboratory (head, D.P. Doronin), Physiology Institute named I.P. Pavlov, Russian Academy of Sciences, St. Petersburg, manuscript received 20 Dec 94; UDC 612.087 + 597.151.17]

[FBIS Summary] Published information regarding the following four neuropeptides whose vasoactivity functions have been fairly documented to date have been reviewed: neuropeptide Y (NPY), vasoactive intestinal polypeptide (VIP), substance P, and calcitonin gene-related peptide (CGRP). Among the main conclusions of the review are the following: NPY, which was discovered in 1982, consists of 36 amino acid fragments, is widespread in the sympathetic ganglia and adrenergic vasomotor nerves, is released from the nerve terminals both by direct electrical stimulation of sympathetic effectors and naturally by activation of the sympathoadrenal system, and is capable of exerting a presynaptic inhibitory effect on induced secretion of sympathetic NPY; ability to inhibit presynaptic cells' release of adenosine triphosphate (ATP) from the nerve terminals upon activation of sympathetic nerves has been proved indirectly; however, no specific binding of NPY receptors have yet been found. Evidence of NPY's role in sympathetic neurogenic vasoconstriction has been found in experiments based on various approaches, including immunoneutralization of NPY. The mechanism of NPY's presynaptic effect remains unexplained; however, the existing evidence provides grounds for concluding that NPY is most certainly a transferrin chemical mediator of sympathetic vasomotor nerves along with noradrenaline and possibly ATP. VIP, which was first discovered in 1970, consists of 28 amino acid fragments and has been shown to be widespread in both the central and peripheral nervous systems. Electrical stimulation of the parasympathetic nerves is accompanied by an increase in secretion of acetylcholine and VIP. Evidence suggests that release of VIP in response to nerve stimulation is suppressed by acetylcholine, which in turn acts through the muscarinic presynaptic receptors. A large body of data exists in support of the fact that even in mammalian quadrupeds, VIP has a direct vasodilatory effect on the peripheral vessels of various parts of the circulatory system. Intravenous injections of VIP in humans in a dose of 400 micrograms for 100 minutes has been demonstrated to reduce average arterial pressure from 90 to 70 mm Hg and to increase minute volume of blood circulation from 6.7 to 8.6 liters. VIP has also been shown to induce weakening of all tissue and massive arterial vasodilation has a pronounced dilatory effect on the coronary channel and cerebral blood vessels, and exhibits an inhibitory effect on vasoconstriction reactions induced by norepinephrine and endothelin. First discovered in 1931, substance P has an 11-amino acid sequence and is widespread in different parts of the nervous system. Substance P's role as a primary afferent mediator that transmits information regarding changes in chemical and physical environmental factors, including pain sensitivity, is considered as established fact. Numerous studies have indicated that substance P is among the most powerful vasodilating agents. It has also been shown to induce a pronounced increase in vascular permeability accompanied by extravasation of plasma proteins and leukocytes. The structure of CGRP was predicted from the known nucleotide sequence of the calcitonin gene. CGRP is widespread in the central and peripheral nervous systems including the sympathetic and parasympathetic sections. Many experiments have shown that activation of sensory nerve fibers by electrical stimulation and/or stimulating drugs or agents is accompanied by the release of CGRP and vasodilation. Studies in laboratory animals have shown that, unlike the vasodilatory effect of substance P, the vasodilatory effect of CGRP is endothelium-independent in many vascular beds. Another difference between substance P and CGRP is the fact that CGRP

is not capable of increasing blood vessels' permeability or extravasation of plasma proteins. However, CGRP is capable of potentiating the effect of substance P as well as the effect of histamine and bradykinin on vascular permeability. It is unclear whether CGRP is involved in regulating vascular tonus or whether it initiates protective hyperemia of tissues in certain circumstances. The wide-scale, if not ubiquitous distribution of the aforesaid neuropeptides in vegetative nerves supplying blood vessels has thus been proved by numerous immunohistochemical studies and confirms the great complexity of the mechanisms of nerve regulation of vascular tonus. The said mechanisms have come to appear even more complicated in light of the discovery of neuropeptides in the sensitive nerve fibers that supply blood vessels and in view their hypothesized "effector" role in regulating vascular tonus. The neuropeptides' neurotransmitter function has been proved rather convincingly. Recent findings regarding the four neuropeptides' roles as chemical mediators would seem to warrant a re-examination of the conventional system of classifying vegetative nerves as either adrenergic and cholinergic. It would also seem that use of the term "modulator" in relation to neuropeptides has not been justified sufficiently and that it is more correct to speak of the aforesaid neuropeptides as having specific "modulating" effects regardless of their chemical nature. Figure 1; references 84: 1 Russian, 83 Western.

Russia: Role of Fragments of Calcitonin Gene-Related Peptide in Regulation of the Microcirculation in Rats

KARDIOLOGIIA. St. Petersburg FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I.M. SECHENOVA on Russian Jan 95 Vol 81 No 6, pp 59-65

[Article by V.A. Akopyan, N.V. Baiandin, S.V. Burov, G.P. Vlasov, and V.I. Kovalkov, Comparative Physiology of Microcirculation Group (head, N.V. Baiandin), Evolutionary Physiology and Biochemistry Institute imeni I.M. Sechenov, Russian Academy of Sciences, and Synthesis of Physiologically Active Polymers Laboratory (head, G.P. Vlasov), High-Molecular-Weight Compounds Institute, St. Petersburg; manuscript received 8 Dec 94; UDC 612.194+557.15/.17]

[FBIS Summary] The role of fragments of calcitonin gene-related peptide (CGRP) in the regulation of microcirculation was examined in experiments performed on 60 male Wistar rats weighing 180 to 200 g each. The rats were anesthetized with Nembutal (40 mg/kg, administered intraperitoneally). Changes in their arterial pressure in response to five CGRP fragments were measured directly in their femoral arteries by using a measurement system based on a PD-1 silicon semiconductor integral strain gauge tensor pressure transducer. The following CGRP fragments were synthesized by using amino acids and amino acid derivatives produced by the Hungarian firm Reanal: (1-9), (10-20), (15-24), (20-29), and (30-37). The peptides (15-24), (20-29), and (30-37) were produced by methods of classic peptide chemistry. The fragments (1-9), (10-20), and (21-31) were produced by the solid-phase method in an NPS-4000 (France) peptide synthesizer. Of the fragments studied, (20-29) manifested the highest level of biological activity. It caused a dose-dependent drop in arterial pressure when administered intravenously and enlarged arterial and venous microvessels when applied locally. Figures 2; references 22: 1 Russian, 21 Western.

Russia: Circulation Impairment During Cerebral Ischemia in Rats and Correction by Leu-Enkephalin

MEDICINSKIE. St. Petersburg FIZIOLOGICHESKIY ZHURNAL SSSR IMENI I.M. SECHENOVA on Russian Jan 95 Vol 81 No 6, pp 87-94

[Article by P.N. Aleksandrov and V.K. Khrapunova, General Microcirculation Pathology Laboratory (head, Professor P.N. Aleksandrov), General Pathology and Pathophysiology Scientific Research Institute, Russian Academy of Medical Sciences, Moscow; manuscript received 10 Nov 94; UDC 616.16+616.831-005.4:599.323.4-001.6]

[FBIS Summary] Impairment in microcirculation during cerebral ischemia and correction by leu-enkephalin was examined in experiments performed on 215 white male nonpedigree rats weighing 200 to 300 g each. Cerebral ischemia was induced by bilateral occlusion of their common carotid arteries. The leu-enkephalin used in the experiments was produced by Serva (Germany) and injected into the rats intraperitoneally (IP) in a concentration of 10 µg per milliliter of a 0.14 M NaCl solution in a dose of 40 µg/kg body weight. Six series of experiments examining the following were performed: spontaneous change in arterial diameter and blood flow in the control animals (series 1); effect of IP injection of 1 ml of a 0.14 NaCl solution (series 2); occlusion of the common carotid arteries (series 3); effect of IP injection of leu-enkephalin (series 4); effect of prophylactic injection of leu-enkephalin 10 minutes before occlusion of the common carotid arteries (series 5); and therapeutic effect of leu-enkephalin when injected 10 minutes after occlusion of the common carotid arteries had been initiated (series 6). In the control animals, the diameter of the pial arterioles and venules remained stable (to more than a 5 percent variation) for the 4-hour observation period. The animals' systemic arterial pressure equaled 98.1 +/- 0.3 mm Hg, and their intraarterial are-

rial pressure equaled 57.2 +/- 1.3 mm Hg. Their starting level of cerebral blood flow in their cerebral cortex equaled 54.4 +/- 1.4 ml/min/100 g. In the subsequent 3.5 hours of the observation period, their cerebral blood flow fluctuated in a range of 90 to 110 percent of the starting level during the 40 minutes of observation. The initial rate of lymph flow in the thoracic lymph ducts equaled 2.8 +/- 0.5 x 10^{-7} ml/kg. IP injection of 1 ml of 0.14 M NaCl did not induce any statistically significant changes in the study parameters ($p \geq 0.05$). Bilateral occlusion of the common carotid arteries was accompanied by a persistent decrease in intracranial pressure, reflecting a pressure in the vascular system of the brain up to 34.1 +/- 2.7 mm Hg, which was 59 percent of the initial pressure. Cerebral blood flow in the cortex was reduced to the same extent. The greatest decrease in cerebral blood flow was a val 11 to 25 minutes after the initiation of occlusion. IP injection of leu-enkephalin in a dosa of 400.0 µg/kg facilitated the maintenance of stable blood flow in the micro-vessels after occlusion of the common carotid arteries by constricting a portion of the arterioles and reducing the degree of dilation during ischemia. The said changes were accompanied by decreases in arterial pressure and bradykinin level, an increase in local blood flow in the cerebral cortex (by 50-70 percent), and an intensive increase in lymph flow in the micro- and macro-vessels. The effects of leu-enkephalin administered before occlusion of the rats' common carotid arteries were similar to those after occlusion. In addition, none of the animals receiving the leu-enkephalin died in the first 10 hours of occlusion of their common carotid arteries, whereas 12 percent of the rats subjected to occlusion of their common carotid arteries and not administered leu-enkephalin died within the same time period. Figures 3; references 19: 14 Russian, 5 Western.

Russia: New Approaches to Laboratory Diagnosis of Tuberculosis

VNADONDZA Moscow KLINICHESKAYA LABORATORNAYA DIAGNOSTIKA in Russian No 6, Nov-Dec 95 p 107

[Article by G. M. Nikolayeva, Central Scientific Research Institute of Tuberculosis, Russian Academy of Medical Sciences, Moscow; UDC 616-002.5-078 (manuscript received 22 Jun 95)]

[FBIS Summary] The incidence of tuberculosis has increased greatly in Eastern Europe, in particular in the northern regions of Russia. In Krasnoyarsk Area tuberculosis morbidity is up 53 percent and mortality has increased by 70 percent; child tuberculosis morbidity increased by 42 percent in 1989-1995. Clinical forms of the illness have worsened in all age groups. The change in the epidemiological situation, the pathomorphosis of tuberculosis, the introduction of new methods of obtaining sample material, and the variability of the agent itself and cellular reactions to it have prompted researchers to find new approaches to laboratory diagnosis of tuberculosis. The Central Scientific Research Institute of Tuberculosis has proposed an express method of detecting typical and altered forms of the tuberculosis mycobacteria. The method is based on luminescent bacteroscopy of smears of peripheral blood. In the study of 67 newly diagnosed untreated patients with various forms of tuberculosis of the lungs, typical and granular forms of the tuberculosis agent were found in the blood of 80 percent of the patients. The method is informative, accessible, simple to implement and can be used as a screening method when tuberculosis is suspected. References 7 (Russian).

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